AGRICULTURAL *Chemicals*

In this issue

More on Miller Law

Swift Granulation Process

ESA Blasts Porter

Liquid Fertilizers

Opportunities in Ag Chemicals

Fertilizer Buildings

Insect Surveys

Cotton Production Conference

BOARD OF DIRECTORS of the National Agricultural Chemicals Association at their recent annual meeting in Wilmington, discussed plans for an expanded educational program on safe use of pesticides and plans for boosting the use of pesticides in relation to stored grain, grasslands and forage crops, plant diseases and soil insects. Those attending the meeting were (clockwise around the table): G. C. Romig, American Chemical Paint Co.; Charles H. Sommer, Jr., vice president, Monsanto Chemical Co.; Fred W. Hatch, Shell Chemical Corp.; Leron P. Scoville, National Alkali Co.; Paul Sharretts, Pennsylvania Salt Manufacturing Company of Washington (standing); Paul Mayfield, Hercules Powder Co.; W. W. Allen, Dow Chemical Co. and NAC president; James B. Hopkins, Hopkins Agricultural Chemical Co.; L. S. Hitchner, NAC executive secretary; F. H. Phillips, G.L.F. Soil Building Service; J. V. Vernon, Niagara Chemical Division, Food Machinery & Chemical Corp.; Wm. J. Liggett, Woolfolk Chemical Works, Ltd.; and Chester M. Brown, General Chemical Division, Allied Chemical & Dye Corp.

January, 1956

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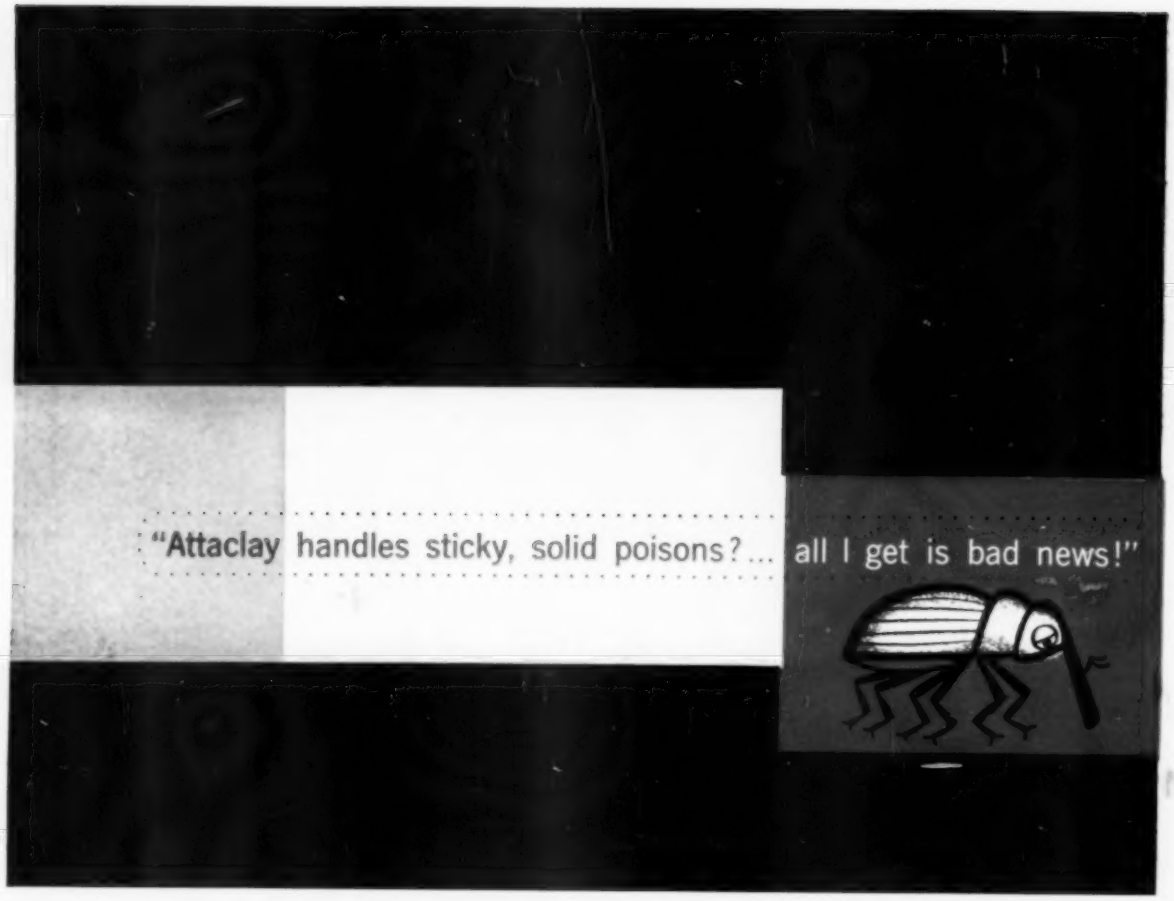

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AGRICULTURAL *Chemicals*

Board of Directors of National Agricultural Chemicals Association discusses plans for an expanded educational program on pesticides at annual meeting in Delaware.

Vol. 11, No. 1 January, 1956

AGRICULTURAL *Chemicals*

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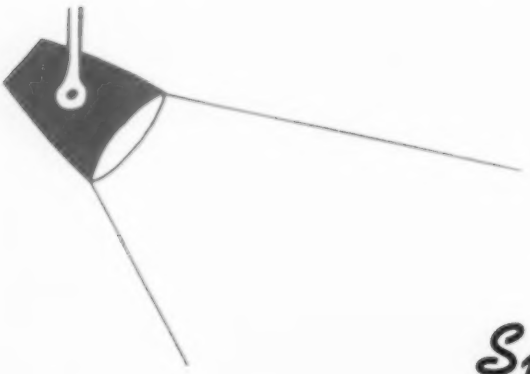


In the Spotlight this Month

● **At the Cotton Conf. . . .** American Cyanamid ("Thimus") has proved highly effective in controlling early season cotton pests in field tests throughout the south in 1955 . . . p. 33.

● Bayer 17147, non-systemic insecticide, shows promise in control of boll weevil and other major cotton pests . . . p. 34.

● Bad timing and too early application were responsible for insecticide failure in southwest on cotton in 1955 . . . p. 34.

● **At the Ammonia Meeting . . .** Anhydrous ammonia well into the era of over-supply . . . p. 77.

● Distribution problems based on: poor merchandising, a seasonal business, and uninformed public . . . p. 79.

● **Seed Coating. . .** It is quite possible that within the next few years seeds may be coated with all the agricultural chemicals needed to increase fecundity, combat pests and diseases . . . p. 41.

● **More on the Miller Law . . .** Even where a crop is threatened by pests, and a hazardous pesticide is known to be effective, safe procedures must still be found and employed. This basic rule applies even though it may necessitate more expensive or less effective measures, or in some cases may even require sacrifice of the crop . . . p. 31.

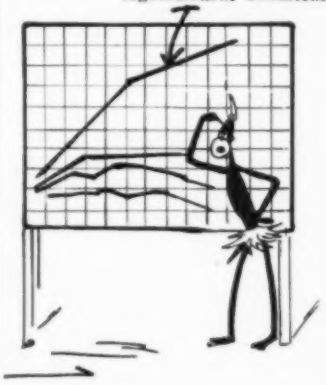
● **Granular Fertilizers . . .** A description of the Swift process of producing granular and semi-granular mixed fertilizers. The materials used in this process are anhydrous ammonia and nitrogen solutions . . . p. 35.

● **Insect Surveys . . .** Adequate surveys provide information on location of pests, extent and degree of infestation, and damage to be expected . . . p. 47.

● **Personnel . . .** Charles Palm discusses the problem of attracting and training sufficient high calibre young men and women today to satisfy demands of the entomological field ten to twenty years from now . . . p. 53.

● **Liquid Fertilizers . . .** The manufacturing equipment for a liquid fertilizer plant can be had for about ten thousand dollars. Essential considerations in building a liquid fertilizer plant reviewed . . . p. 44.

Agricultural Chemicals



Puzzled?

You may be puzzled about what the stock market will do . . . but there can be no question about what magazine to read.

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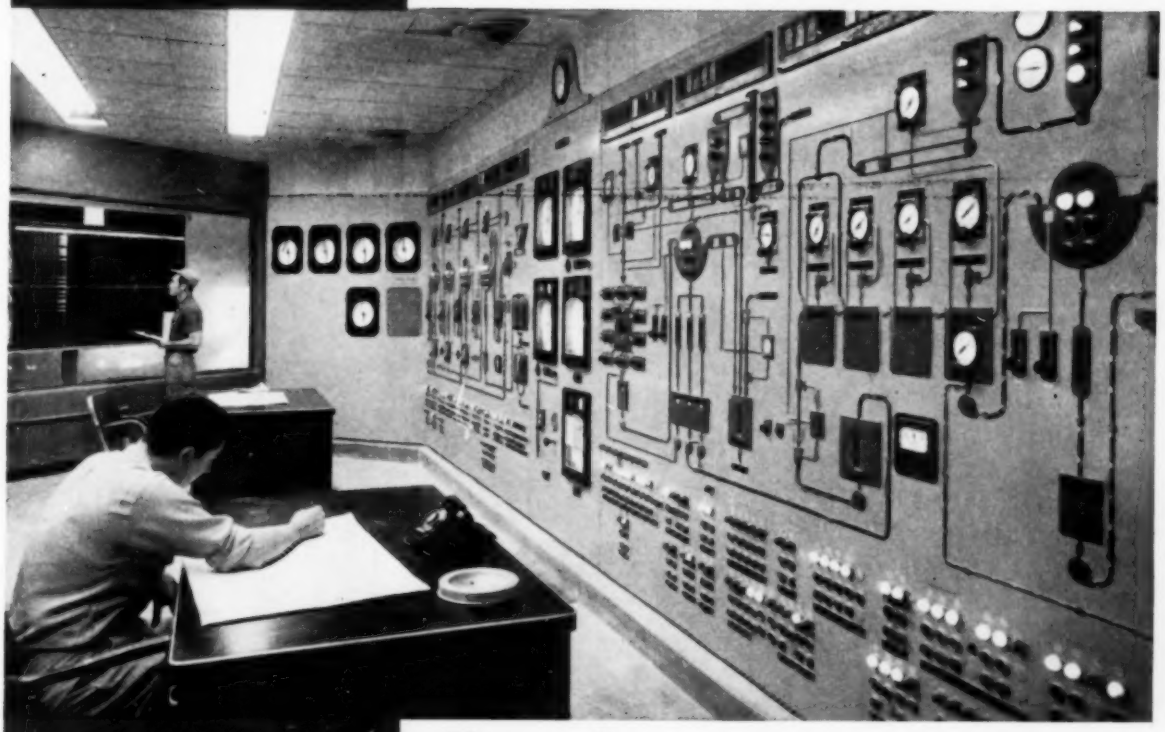

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Raymond Roller Mill No. 3036 with double Whizzer Separator is delivering a 50/50 DDT mixture in a continuous, dustless operation at a fineness of 99% passing 325 mesh at a rate of 1200 to 1500 pounds an hour.

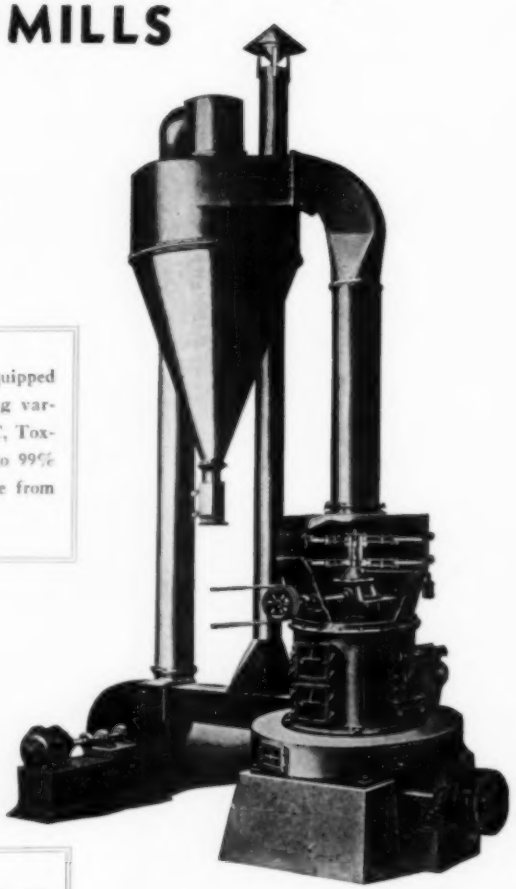
DDT MIXTURES

BHC MIXTURES

In another plant a Whizzer-equipped Roller Mill is installed for grinding various insecticide formulations of BHC, Toxaphene, etc., at finenesses of 98% to 99% through 325 mesh. Capacities range from 1000 to 1500 lb. per hour.

A combination Raymond Roller Mill with a 5' double Whizzer Separator, including special construction features for sulphur jobs, is producing an average output of 2000 pounds per hour of dusting sulphur at 98% passing 325 mesh—also handling field strength mixes at 90% to 95% minus 325 mesh in capacities of 2500 to 3000 lb. per hour.

DUSTING SULPHUR



ROTENONE ROOTS

A plant using a No. 5057 Roller Mill with special grinding faces is pulverizing rotenone-bearing roots to various grades:—95% minus 200-mesh, 95% minus 100 mesh, and 80% minus 100 mesh. Capacity ranges from 609 to 1750 lb. per hour.

Refer your insecticide grinding problems to Raymond engineers. Their recommendations are based on a half-century of experience. A full line of Raymond Roller Mills and Imp Mills are available in capacities and sizes to fit your plant.

Write for Bulletin #68

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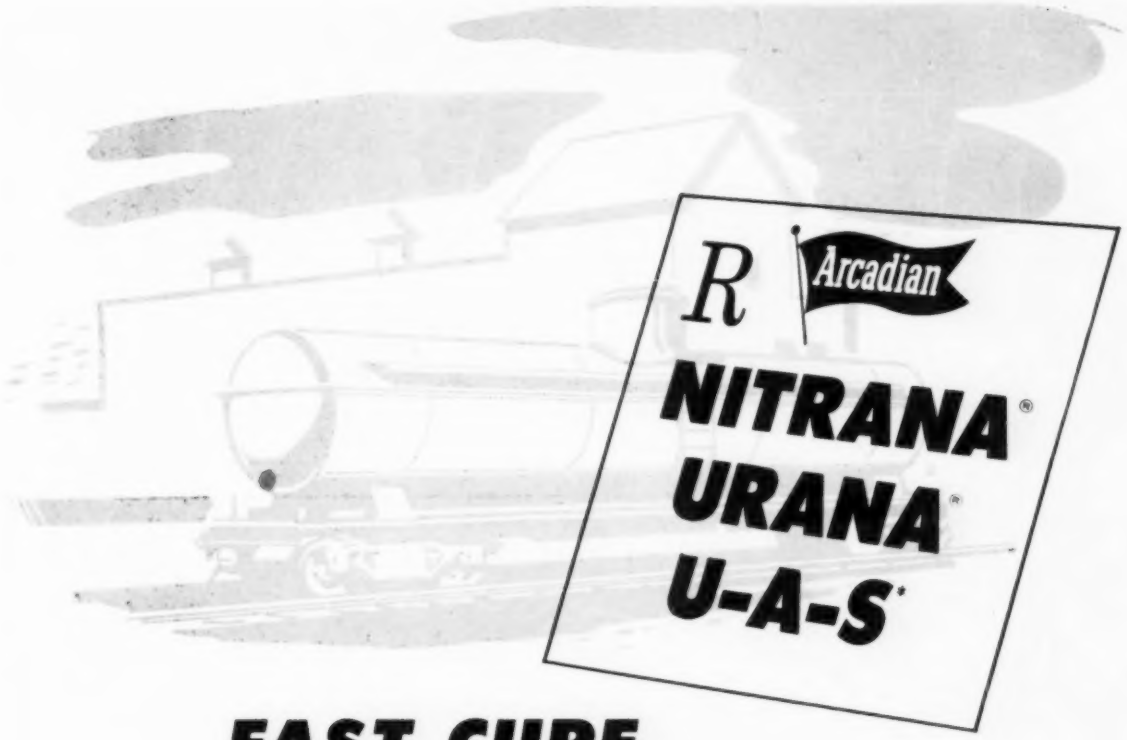

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DIAZINON*

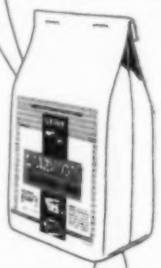
FORMULATIONS

There is no need for us to tell you how important fly control is in your dairy barns and that effective fly control makes for contentment of the herd, increased milk production and greater profits.

However, we do feel that we should bring to your attention the fact that DIAZINON, the amazing new fly killer you've been hearing so much about is now recommended for control of flies in dairy barns. Exhaustive tests have shown that residual applications in dairy barns do not result in milk contamination.

Another outstanding product of Geigy's long range research program, DIAZINON has both quick knock-down action and long residual properties. Reports of the superior effectiveness of DIAZINON have been received from research workers in thirty-nine states, where it has proven to be the most effective residual fly control chemical since the introduction of DDT insecticides by Geigy.

Because of DIAZINON'S long residual action, two or three sprays will usually control flies in dairy barns for an entire season. Only 4 lbs. of the 25% wettable powder in 25 gals. of water is required to treat an average size dairy barn.



A DIAZINON program, in conjunction with good sanitation measures, now offers safe, effective and economical fly control for the dairy barn and other farm buildings.

Ask your local farm supply dealer about DIAZINON . . . available in wettable powder, emulsifiable and granular bait formulations.

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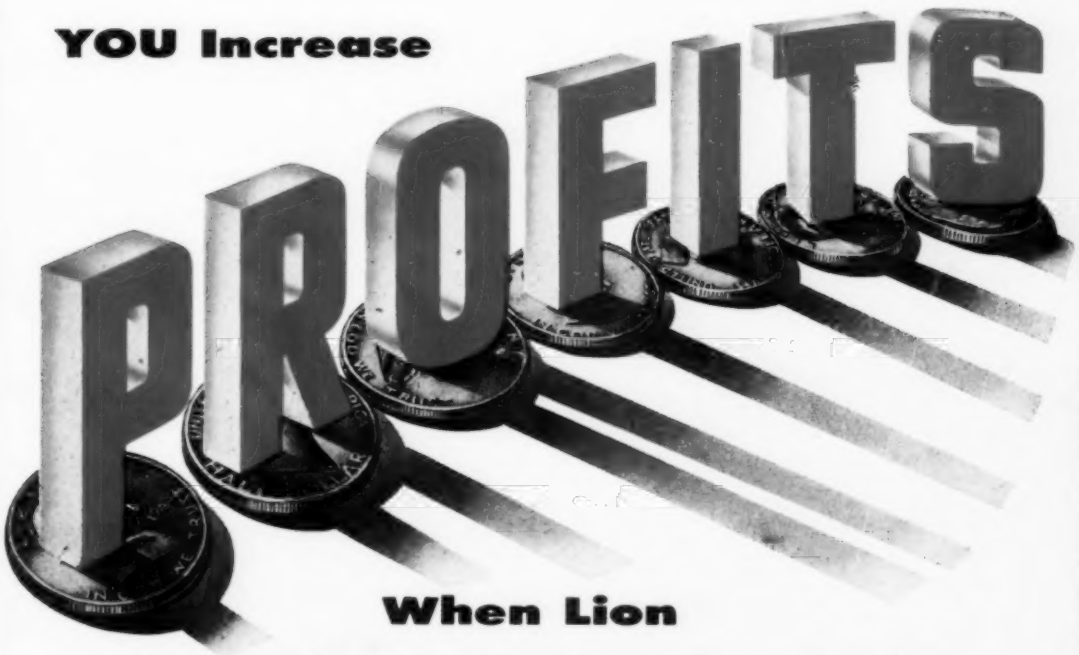

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Lion Nitrogen Fertilizer Solutions—Various types to suit your particular manufacturing needs.

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Lion nitrogen products are manufactured under rigid controls to meet exacting specifications—ending the costly production delays that result when ingredients vary in quality from day to day. With Lion products, you produce with maximum efficiency and profit—and you maintain the quality standards your customers demand.

Lion also provides an expert technical staff to assist you in solving difficult formulation and processing problems. And, throughout the year, Lion's sales building advertising tells farmers the plant food story—for your benefit. Lion's leadership in customer service stands out, offering you outstanding opportunities for increased profits—and your best season yet!

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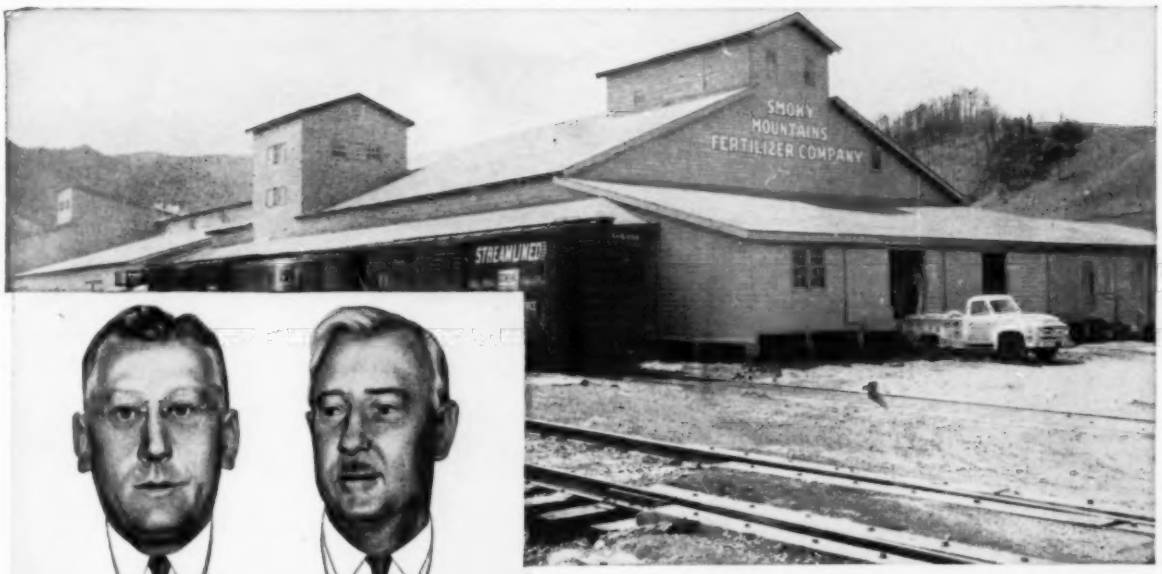
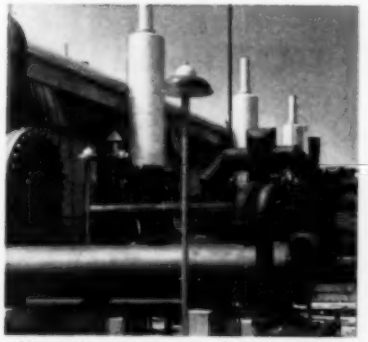


C. G. Thompson (left) is president and J. W. (Jack) Rutland is vice-president of this fast-growing company.

The only fertilizer plant in the famous vacation lands of the Great Smoky Mountains, the Smoky Mountains Fertilizer Company is located at Hazelwood, N. C. The company was started in 1950, and serves a radius of 100 miles with Blue Ridge Brand Plant Foods.

Smoky Mountains Fertilizer Company ... Another Spensol User



Here is some of the modern equipment used by Spencer to produce SPENSOL Nitrogen Solutions for some of America's leading fertilizer mixers.

On time deliveries of SPENSOL solutions have helped to build Spencer's reputation for dependable service to mixers throughout the country.

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aldrin

SHELL

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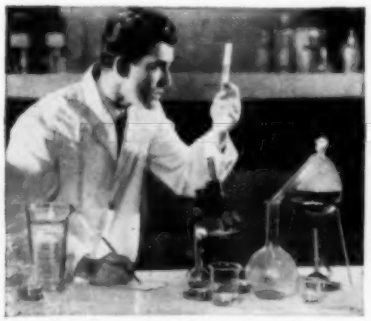

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Type toxicants used.....

Type solvent used.....

Lbs. Toxicant/gal. of concentrate.....

Water hardness range:.....ppm.

Emulsion stability required.....

Please send me:

☐ Samples ☐ Information

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Name.....Title.....

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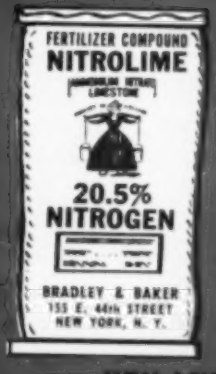
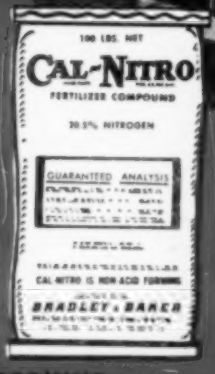
Just as your customers demand maximum crop production, you can achieve maximum volume and profits with these two great sources of *non-acid forming nitrogen* – NITROLIME and CAL-NITRO.

Consisting of half nitrate nitrogen and half ammonia nitrogen, the guaranteed 20.5% nitrogen content of these fertilizer compounds is an ideal economical source of the vital plant food that assures greater crops of all kinds. Both these productr are perfectly balanced for fast action and resistance to leaching, are *non-acid forming* and come in handy granular form, free-flowing and easy to apply by hand or machine.

With CAL-NITRO and NITROLIME you have at your disposal an excellent merchandising program of sample displays, local newspaper advertising, radio spots and other aids. Bradley & Baker is ready to help you sell more of these better nitrogen fertilizers. Get the complete details today.





NON-ACID FORMING

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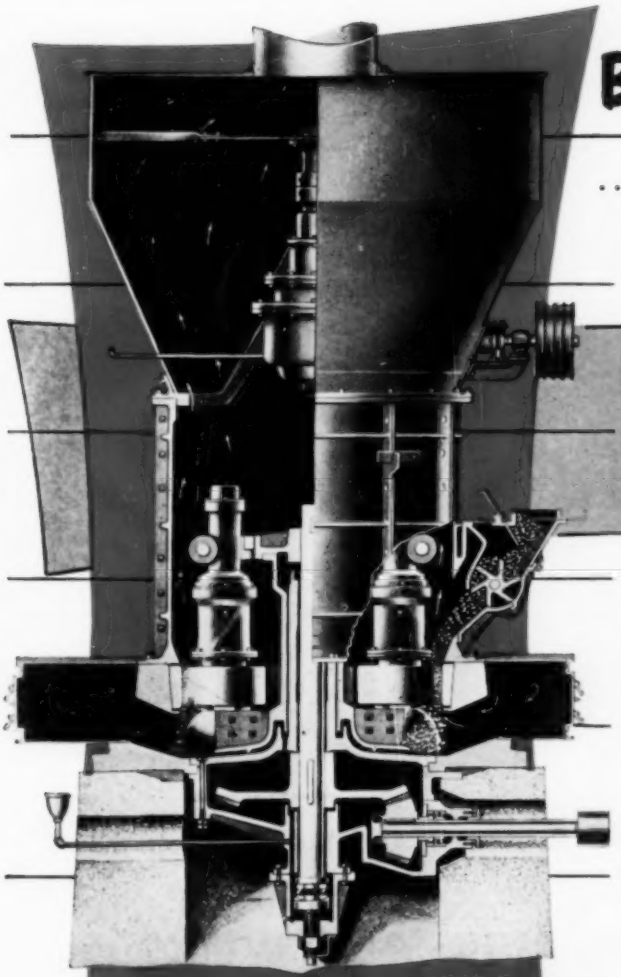
Better Fine Grinding...

...How to improve accuracy, uniformity and output at reduced cost

WILLIAMS Roller Mills



Cross section of Roller Mill showing how material is ground by rolls rotating against bull ring, then air swept to separator which extracts fines and returns coarse material to mill for regrinding.

Positive and continuous precision size control at exceptionally high production rates are only two of the superior features of Williams Roller Mills. Instant adjustment for grinding from 20 mesh down to 400 mesh, even to micron sizes, has established the Williams as one of the most versatile of fine grinding mills. Finished products can be maintained at finenesses of 99.9% + passing 325 mesh.

The operation of a Williams Roller Mill is simple, yet performance remains unsurpassed. Positive, self-adjusting feeding and blending of raw materials into the mill is automatic where pulverizing is done by grinding rolls spinning centrifugally against a bull ring. A continual rising current of cool air sweeps upward carrying ground material to the classifier that separates all finished fines from the coarse tailings which are all returned for further grinding.

Rugged construction promises less down time, lower power costs, minimum maintenance. Automatic take-up for wear is continuous.

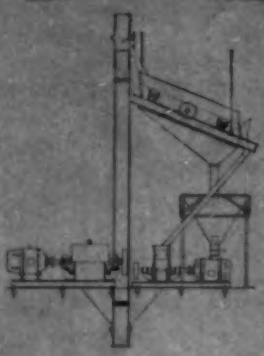
Find out how easy it is to improve product quality and reduce production costs. Get all the facts about Williams Roller Mills.

Write today for literature.

***TESTING AND RESEARCH LABORATORIES** are at your service to help you solve every size reduction problem. Write for information.*

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

2707 N. Broadway St. Louis 6, Mo.



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Williams builds all types of ready-to-install plants for crushing, grinding and air separation, including storage bins and electrical equipment. Consult the industry's most experienced engineers. Write!

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Hammer Mills Helix-Seal Mills Air Separators Vibrating Screens Feeders Impactors

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

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Growth and Expansion Goes to Those who Prepare for It. NAC Keeps Its Membership Informed on the ever-changing developments in the pesticide field at both the national and state levels.

Make It A Joyous And Prosperous New Year

For detailed information of the benefits in membership, write:

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1145 19th Street, N. W.
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Report on the 15 cu. ft. MICHIGAN 12B:

New Tractor Shovel features power-shifting, twenty per cent more weight and power

Heavier and more powerful than comparable machines, and infinitely easier to operate—that's the new MICHIGAN 12B. There's no clutch pedal or engine clutch on the 12B: Clark's power-shift transmission completely eliminates this notorious cause of excessive maintenance and down time. From the cutting edge of the 15 cu. ft. bucket to the flywheel of the 44 or 42 horsepower engine (gas or diesel), the MICHIGAN 12B is simply *more* machine.

20% more weight and power. At 6250 lbs. (6350 lbs. diesel), the 12B is 20% heavier than most machines in its class. With 44 or 42 horsepower, gas or diesel, it is 20% more powerful. This margin of weight and power, plus bucket break-out action, enables the 12B to dig its way into material where other machines merely spin their wheels. The 12B's extra weight, low center of gravity and low-level bucket carry-position contribute to its superior stability: you can handle maximum loads safely and fast within its short turning radius.

Instant power-shifting. Engine torque is multiplied up to 300% by the Clark torque converter—automatic torque build-up as you meet tighter, tougher materials. To shift between High, Low or Reverse, simply push the single power-shift lever to the desired position. Hydraulic power in the constant mesh power-shift transmission makes any shift instantly, even when travelling. There's no clutch pedal, no engine clutch, no gear clash. And as any operator will tell you, *it sure beats riding a heavy clutch all day!*

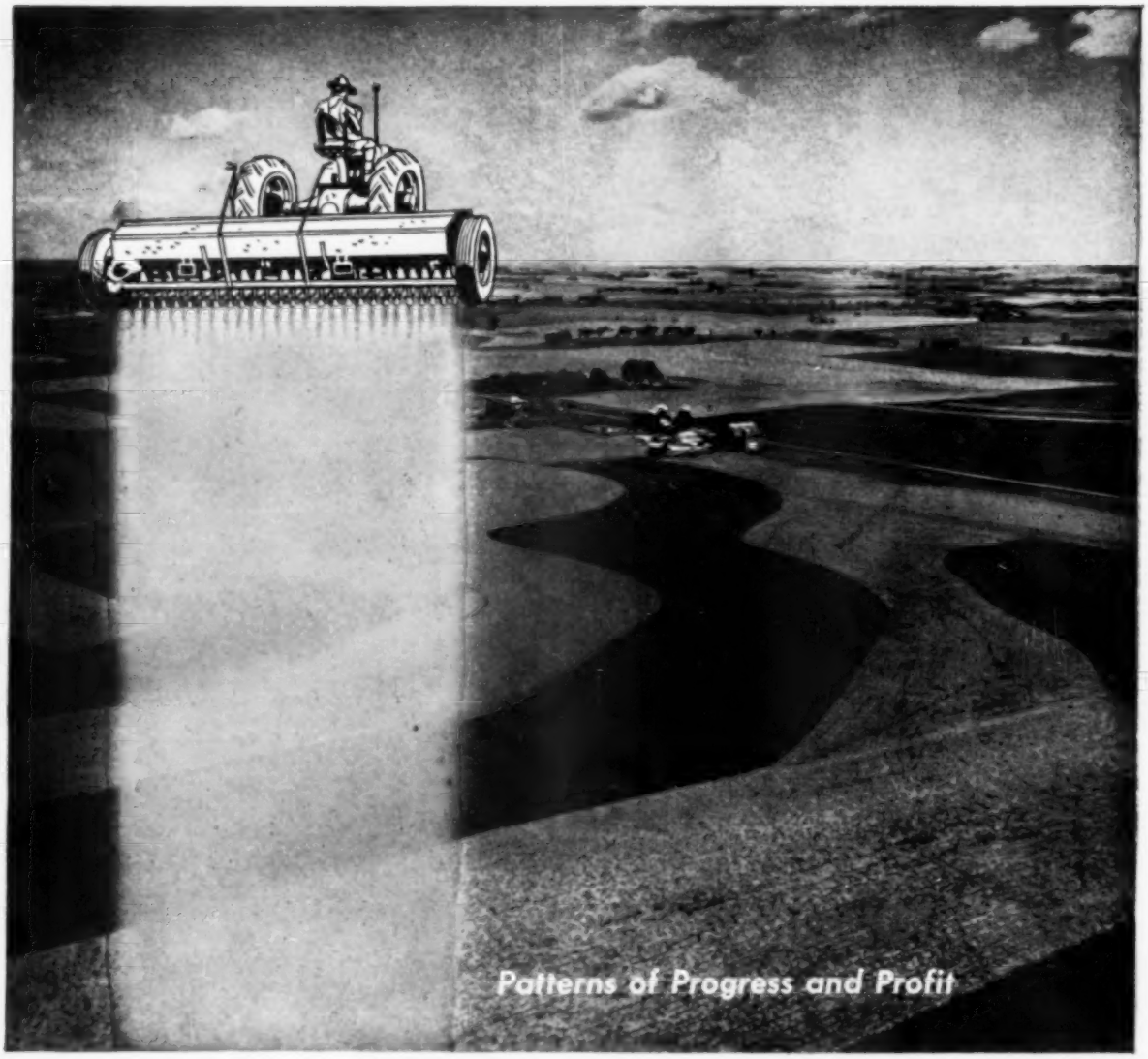
Complete dust protection. The 12B is protected against dust and dirt in every conceivable way. An oil bath air cleaner filters the air which enters the main hydraulic reservoir. There is a filter for the torque converter oil and the power-shift transmission oil. A partial flow filter protects the engine lube oil. Transmission, torque converter, starting motor and generator are all dust-sealed. On the 12B, every precaution has been taken to avoid dust problems.

Make your own comparison. Neither words nor specifications can indicate the working superiority of the new MICHIGAN 12B. You've got to see it in action—see it handling your toughest job. Call your local MICHIGAN distributor or write us direct to arrange an on-the-job demonstration. The new 12B is available on a low cost, no-down-payment Lease Plan—ask for details. Whether you lease or buy the 12B, it will pay for itself faster than any Tractor Shovel you've ever seen. See it!

MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2463 Pipestone Road,
Benton Harbor 35, Michigan



(Photo — Courtesy Soil Conservation Service, U. S. D. A.)

High Grade Muriate of Potash

by DUVAL

Duval Muriate of Potash ranks high as one of the essential nutrients which greatly increase yield and profits in crop production.

DUVAL SULPHUR and POTASH CO.
Modern Plant and Refinery at Carlsbad, New Mexico

Address all communications to:
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TC-O-GRAM

617-629 Grant Building, Atlanta, Ga.

JANUARY, 1956

MR. FERTILIZER EXECUTIVE:

WE KNOW IT IS YOUR DESIRE AND PURPOSE TO PROVIDE YOUR CUSTOMERS WITH MOST EFFICIENT FERTILIZER YOUR "KNOW HOW" AND AGRICULTURAL SCIENCE INDICATES . . . BUT ARE YOU ACCOMPLISHING THIS?

TO ANSWER YES, YOUR FERTILIZER SHOULD CONTAIN ADEQUATE CONCENTRATIONS IN READILY AVAILABLE FORM OF ESSENTIAL TRACE ELEMENTS SUCH AS COPPER, MANGANESE, ZINC, IRON, MAGNESIUM, BORON.

IF ESSENTIAL TRACE ELEMENTS ARE NOT PRESENT IN ADEQUATE CONCENTRATIONS, YOU ARE NOT OFFERING YOUR GROWERS COMPLETE PLANT FOOD.

JOIN RANKS OF LEADING PROGRESSIVE FERTILIZER MANUFACTURERS . . . BOOST YOUR SALES AND FURTHER MIXED GOODS INDUSTRY BY MANUFACTURING EVEN BETTER MIXED FERTILIZERS.

MAKE YOUR CUSTOMERS THE BEST PRODUCT POSSIBLE

LET TENNESSEE CORPORATION TALK WITH YOU ABOUT OUR MINERAL MIXTURES PROGRAM. INEXPENSIVENESS AND EASE OF ADDING TRACE ELEMENTS SHOULD NOT BE OVERLOOKED BY PROGRESSIVE, PROFIT MINDED MANAGEMENT.

Samples, Specifications and Detailed Information Available Upon Request.

TENNESSEE TC CORPORATION

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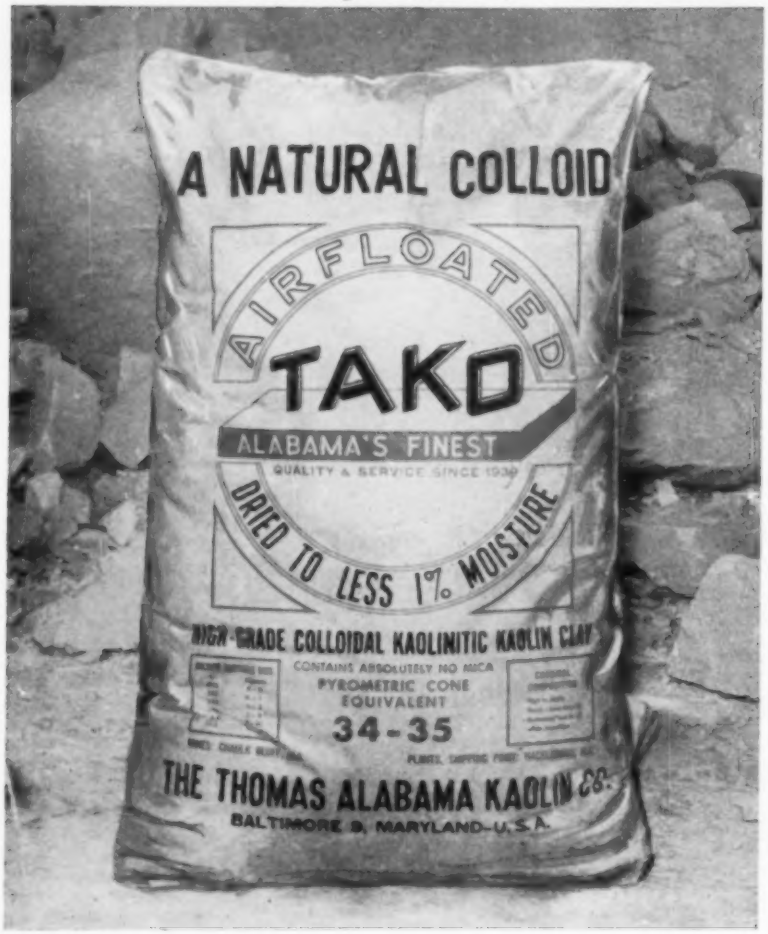
A NATURAL QUALITY PRODUCT



"TAKO" Natural High Grade Pure Colloidal Kaolinitic Kaolin Crude from our very extensive exclusive deposits is processed by neither adding to nor taking away any of its most desirable properties. Its colloidal properties give increased workability in formulations and its purity is highly desirable due to its compatibility with other chemicals.

"TAKO" Airfloated Colloidal Kaolinitic Kaolin Clay is an excellent natural and exclusive product—a colloid—contains absolutely no mica—practically chemically pure—very low in iron (Fe_2O_3) extremely low in all other chemical impurities.

Non-abrasive • Non-hygroscopic • Non-caking • Free-flowing

Loose bulk density approx. 20 lbs./cu. ft.,
packed bulk density approx. 50 lbs./cu. ft.,

"TAKO" is produced under complete laboratory control. Large tonnage used for years by the chemical, fertilizer, insecticide and other large industries.

IT WILL PAY YOU TO INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

Write for samples and complete information

THE THOMAS ALABAMA KAOLIN COMPANY

2412 KEN OAK ROAD, BALTIMORE 9, MARYLAND

Mines: Chaulk Bluff, Alabama Plants and Shipping Point: Hackleburg, Alabama

News Brevities

YOUNG AND MAZURA PRODUCE, INC., Riverhead, N.Y., were recently granted a charter of incorporation. The new firm will manufacture fertilizer and insecticides.

AC

WILLARD P. SCOTT, a director of American Potash & Chemical Corp., Los Angeles, since 1951, has been appointed a vice president of the company.

AC

RAYMOND E. TUTTLE has been made manager of a new technical department for the Bonnie Phosphate Chemicals plant of International Minerals & Chemical Corporation near Bartow, Florida.

AC

COASTLAND CHEMICAL CORP., New York, was recently granted a charter of incorporation for the manufacture of agricultural products.

AC

WISCONSIN ALUMNI RESEARCH FOUNDATION have recently issued an 11 x 16, 2-color poster in a campaign for clean grain. The poster heading states "Clean Grain Means More Money."

AC

KAW FERTILIZER SERVICE, INC., Prairie Village, Kans., has been incorporated to produce agricultural fertilizers, chemical and organic products.

AC

A UREA FERTILIZER PLANT is under construction in Chungju, Republic of Korea. The project will be financed under the US aid program at an estimated cost of $19 million, and is scheduled for completion within 30 months.

AC

MINERAL AGGREGATES CORP., Salida, Colo., a new company, has been formed to process and market a mineral ore "Mineralog" as a soluble soil "amendment." The ore contains about 37% sulfate and 26% calcium, with small percentages of magnesium, potassium, phosphorous, free sulfur and nitrogen.

DOUBLE VALUE
DOUBLE POWER

FOR YOU...

FOR DEALERS...

FOR FARMERS

Sul-Po-Mag®
Water-Soluble Double Sulfate of Potash-Magnesia
$K_2SO_4 \cdot 2MgSO_4$
22% K_2O · 18% MgO
SULFATE OF POTASH
for the profitable production of crops sensitive to chlorides
SULFATE OF MAGNESIUM
for high yields and quality on magnesium-deficient soils

DOUBLE POWER

Sul-Po-Mag supplies both sulfate of magnesium and sulfate of potash in balanced combination and in water-soluble form. It's used by leading fertilizer manufacturers in the premium grades they make for soils low in magnesium and potash. *Sul-Po-Mag* is a well conditioned material that can be used in your present mixing processes.

DOUBLE VALUE

Sul-Po-Mag delivers double value, too. It provides the extra ingredients that make your fertilizer a premium quality grade you and your dealers can sell with pride and confidence. It supplies the extra ingredients that bring farmers many dollars of extra profit for small additional cost.

AT CARLSBAD, NEW MEXICO

At Carlsbad, New Mexico, the POTASH DIVISION mines and refines these quality materials for fertilizer manufacturers — Muriate of Potash, Sulfate of Potash, *Sul-Po-Mag*.

The need for sulfate of magnesium and sulfate of potash for the profitable production of a wide variety of crops in many farming areas is shown by research carried on by many agricultural colleges.

Consistent advertising in farm papers, and on radio and billboards is telling farmers that the most effective way to supply soluble magnesium and potash is to use a quality mixed fertilizer containing *Sul-Po-Mag*. We're building consumer acceptance for your premium grades — so cash in on the growing demand by using *Sul-Po-Mag* in the fertilizers you make for soils low in magnesium and potash. Identify your brand as a premium grade product by showing soluble magnesium in the analysis on the bag . . . $N\text{-}P\text{-}K_{Mg}$.

PUT IT IN THE BAG

PUT IT ON THE BAG

POTASH DIVISION INTERNATIONAL MINERALS & CHEMICAL CORPORATION • GENERAL OFFICES: 20 NORTH WACKER DRIVE, CHICAGO 6

On Schedule

First Shipment Made December 15th

urea-ammonia solutions . . .
ammonium nitrate solutions . . .
anhydrous ammonia

THEY'RE on their way . . . the first cars of high-quality nitrogen solutions and anhydrous ammonia from Sohio.

We've started shipments against orders, and we're ready to serve your needs for the coming season.

So make Sohio a part of your 1956 plans. You'll find our complete line of Sohiogen solutions can mean greater flexibility, convenience and cost-cutting formulation . . . with your choice of the right solution to fit your exact needs.

Remember — our new, modern urea plant is nearing early completion . . . supplying high-quality, coated and uncoated, prilled Sohiogro Urea, for direct application sales; for fertilizer manufacture.

PROMPT SERVICE...UNMATCHED FACILITIES...UNIFORM HIGH QUALITY

- **CENTRALLY LOCATED** in America's agricultural heartland.
- **FAST DELIVERY** 5 railroads serve Lima—Erie, B&O, Nickel Plate, DT&O, and Penna.—plus 24-hr. truck delivery within trucking areas.
- **LARGEST STORAGE FACILITIES** in the country in relation to production capacity . . . meets peak season demands.
- **GUARANTEED ANALYSIS** of every car.
- **LABORATORY** and technical service.

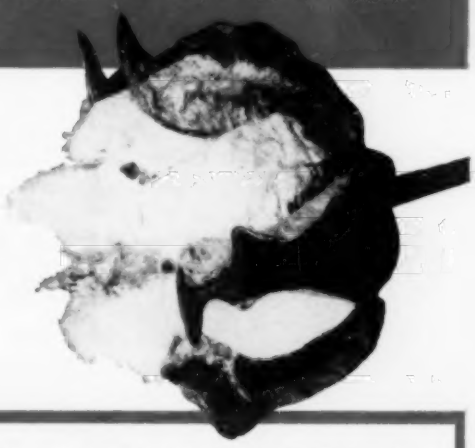
SOHIO

SOHIO CHEMICAL COMPANY

Ft. Amanda Road • Lima, Ohio

with sufficient potash

IN COTTON, POTASH-ENRICHED FERTILIZERS MAKE THE DIFFERENCE



without sufficient potash

In nutrition-poor soils, balanced fertilizers make the difference between a bad or good crop for the farmer, a bad or good year for his pocketbook, too. Potash, a basic partner in these balanced fertilizers, builds crop resistance to disease, improves crop quality and increases yield.

U. S. P.'s high grade muriate of potash has the highest K_2O content and is free-flowing and non-caking—important advantages in the manufacture of these modern fertilizers which help American farmers to better crops and better incomes.

SUNSHINE STATE POTASH — PRODUCT OF NEW MEXICO U.S.A.

REG. U.S. PAT. OFF.

HIGRADE MURIATE OF POTASH 62/63% K_2O
GRANULAR MURIATE OF POTASH 60% K_2O MIN.

UNITED STATES POTASH COMPANY

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Southern Sales Office
Rhodes-Haverty Building, Atlanta, Georgia

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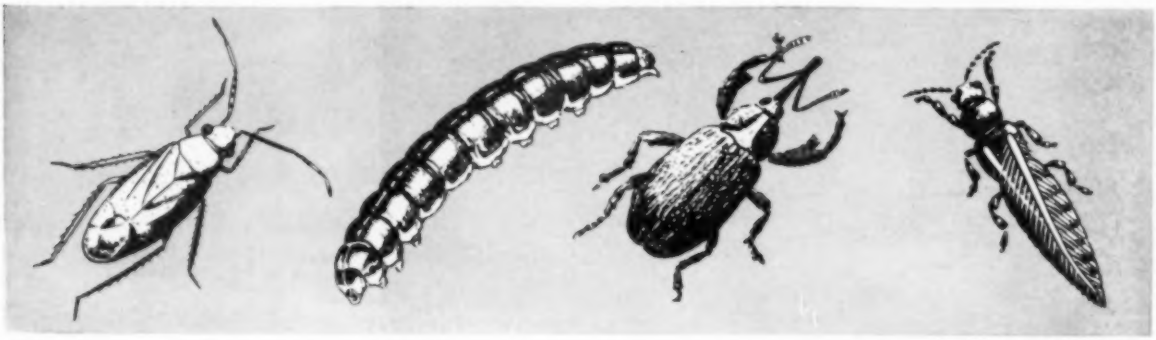
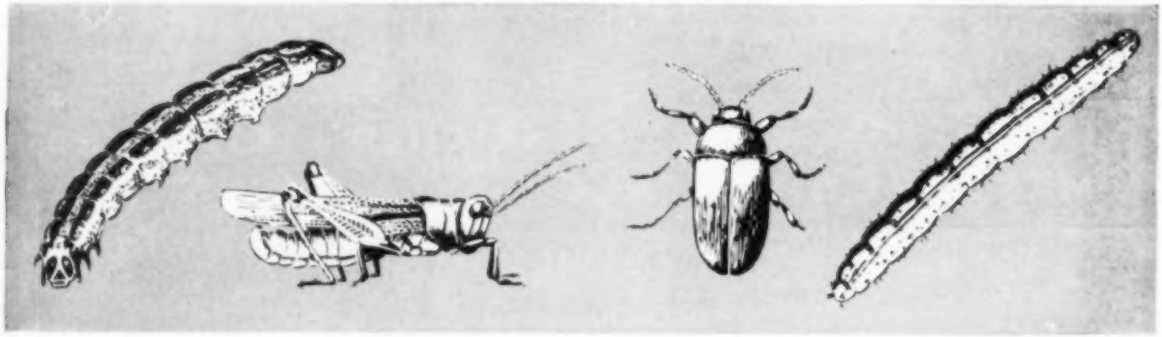
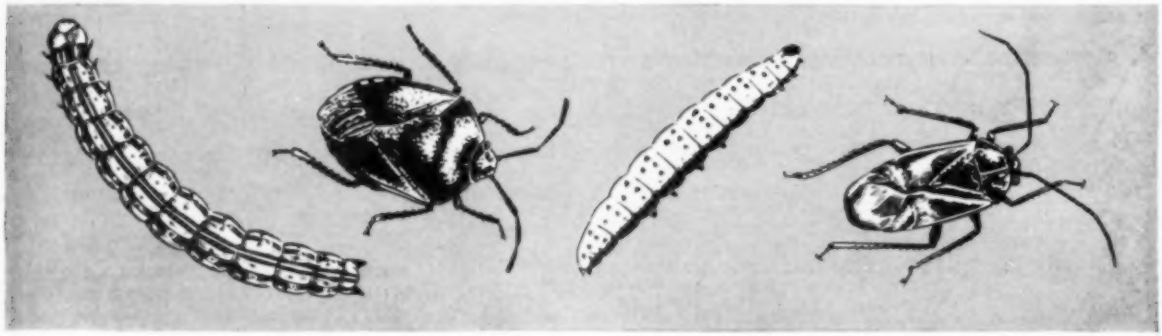


EFFECTIVE, ECONOMICAL CONTROL



OF MORE THAN 200 INSECT PESTS



HERCULES POWDER COMPANY

INCORPORATED

Agricultural Chemicals Division, Naval Stores Department • 970 Market St., Wilmington 99, Del.

NS56-1

Editorial
COMMENTS

THAT old story about the farmer who wasn't interested in buying a set of books about scientific farming because "shucks, I'm not doin' half the things I know about now," has a lot of truth to it. In the rush to tell farmers about all the *new* fertilizers and pesticides, we sometimes forget that the men on the nation's farms aren't using half the resources *already* at their disposal.

Government figures on actual use of agricultural chemicals as compared with recommendations of experiment stations should serve to remind us that some of the things industry leaders take for granted still are looked on with skepticism by many farmers. In our optimism, we sometimes forget that fact.

The point was brought home last month in the course of an interview with a fairly typical Eastern farm manager, as we toasted our chilled feet by the stove in his farm shop. Our man wasn't dead set against change, to be sure. Rather, his comments vacillated between enthusiastic acceptance and cynical rejection of new chemicals and new methods of applying them. It was a strange ambivalence, but one that we suspect is not atypical of the men who till the soil.

For instance, Farmer B., as we'll call him, was bragging about the wonderful success he has been having with Sinox PE in controlling chickweed on his farm. Then he told us about the fine job lindane is doing in keeping pea aphid and spittlebug out of his alfalfa. Furthermore, he spoke favorably of periodic soil tests, which he banks on for guidance in applying fertilizers.

When we asked him for his opinion on granulated fertilizer, we saw both sides of his personality. "Give me a fine dry fertilizer any day in the week," was his immediate reaction. A few minutes later, however, when we were discussing the use of ammonium nitrate on grain, he admitted, a bit reluctantly, that "we use granulated ammonium nitrate and it does a nice job. It goes on pretty even."

"What about fall fertilization?" we asked.

"I've always been successful in the spring, so why should I change?"

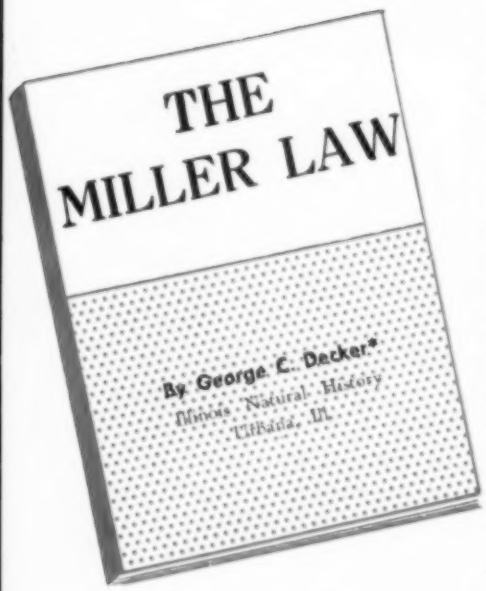
"Do you buy fertilizers well ahead of the spring planting season to beat the rush?"

"Don't see why I should. Just costs more to handle the bags twice, and besides, it takes up a lot of storage space. I like to buy it when I need it and have the boys put it right in the spreader."

The subject moved on to the value of following the advice of county agricultural agents. *Did Farmer B. cooperate with them by testing fertilizers and pesticides on small plots?*

"Last time the county agent stopped in here — must have been three or four years ago — he

(*Continued on Page* 103)



PUBLIC LAW 518, popularly known as the Miller Bill, which is in reality an amendment to the Food, Drug, and Cosmetic Act of 1938, was enacted July 22, 1954, and scheduled to become effective one year from that date (7/22/55). However, a number of unavoidable delays resulted in a series of temporary extensions of deadlines, which contributed materially to the confusion that prevailed during the 1955 crop-growing season. This stage of confusion is about over, and it now appears reasonably certain that most if not all pesticides, which means fungicides and herbicides as well as insecticides, will come under the tolerance provisions of the Act before the beginning of the next crop season, perhaps on or by February 1, 1956. This means that fresh fruits, vegetables, and all other raw agricultural products moving in interstate commerce after that date will be subject to inspection by representatives of the Food and Drug Administration, and some condemnations or confiscations may be anticipated when and if pesticide residues in excess of the established tolerances are found on such products.

Many individuals unfamiliar with the legislative trends of the past few years may be unduly alarmed at this turn of events. Actually, however, we have in a sense been operating under a system of unofficial tolerances or mutual agreements ever since the passage of the Food, Drug and Cosmetic Act of 1938. We got along remarkably well under that system for over a decade, but with the advent of many new pesticides, some individuals and agencies became apprehensive that pesticide residues on food crops might affect the public health, and they instigated a prolonged congressional investigation. It had long been generally agreed that our food supply must be protected from unnecessary or hazardous contamination but, as so often happens, the investigation turned into an inquisition and some unduly drastic legislation was proposed that would have put all pesicides in a class with drugs. Then, Congressman Miller of Nebraska, a member of the Congressional Investigating Committee, introduced a bill that clearly separated pesticides from other chemicals that are or might be deliberately added to foods for various purposes, and at the same time provided adequate protection of the public. There are those who severely criticize the Miller Bill as drastic, unfair, and unduly burdensome, but we must bear in mind that the public welfare has received in the past, and perhaps always will receive, the benefit of doubt in the deliberations of all legislative and governmental regulatory bodies.

Those who condemn the Miller Bill are perhaps not aware that it was supported by both industry and agriculture, and obviously they have little or no concept of the alternative proposals that were before Congress at the same time. The Miller Bill may impose limited hardships on some, but those who have followed the legislative history of this Act seem agreed that it represents the fairest and most liberal provisions obtainable. The problems posed by the passage of the Miller Bill are by no means insurmountable, nor are they as complex or as baffling as they might first appear. The job confronting the farm adviser and the pest control specialist is primarily one of education.

It is important that the general public, the farmer, and the fruit and vegetable growers in particular, be made fully aware that all pesticides must be and are thoroughly tested before they are released and sold for even a few restricted and carefully specified uses. They should know that the federal Insecticide, Fungicide and Rodenticide Act of 1947 is a very effective supplement to the Food and Drug Act. This law requires that all pesticides moving in intersate commerce must be registered by the United States Department of Agriculture, and before registration is granted, the manufacturer must demonstrate to the satisfaction of the Secretary of Agriculture that his product meets the requirements set up for evaluating pesticide performance and safety. The manufacturer

*Presented at the Illinois State Horticultural Society, November 28, 1955, Springfield, Ill.

is required to place on his labels instructions for use which, if followed, will provide adequate protection for the public. The Act further provides that, where needed, the label must also bear a warning or caution statement which, if followed, would adequately prevent injury to living man, other vertebrate animals, vegetation, and useful invertebrate animals. When the question of residues is involved, the Department of Agriculture invariably takes into consideration the tolerances that have been or may be established by the Food and Drug Administration before a proposed label is approved to make sure that the residues indicated in research findings would not be considered objectionable.

The manufacturers of insecticides and other pesticides spend millions of dollars each year on the research required to obtain the data that will establish the validity of their labels. Thus the labels on pesticide containers may rank among the most costly literature in the world. These labels are placed on every container for the guidance and protection of the user. Perhaps it should be mentioned here that, in the eyes of the law, booklets and other supplemental materials that pesticide manufacturing companies pass out for the guidance of those using their products are regarded as a part of labeling, and they are thus subject to the same legal requirements as the label on the package.

The fruit grower, and for that matter all pesticide users, should be fully aware that the mere fact a given pesticide can be purchased in the market place does not mean it can be used promiscuously and without danger or any or all crops. Such is rarely the case. In many instances, available pesticides have only a few accepted or approved uses. Thus it is imperative that the grower determine in advance that each pesticide he proposes to use has label acceptance for particular pest and crop involved.

In general, pesticide users who carefully read and closely follow instructions and warnings placed on pesticide containers will encounter little or no difficulty in meeting the tolerances established. However, those who are careless or take chances may easily get into serious trouble. If the label says use 1 pound per acre or per 100 gallons of spray, it means 1 pound, not 2 or 3. Likewise, if the label says do not apply to crops within one month of harvest, it means just that. When a grower ignores the provisions on the label and takes matters in his own hands, he assumes a calculated risk for which he and he alone is responsible.

It is safe to say the pest control recommendations made by representatives of state and federal research and extension agencies are and always have been sound, but at the present time entomologists, plant pathologists, and other specialists in the pest control field are carefully reviewing all of their current recommendations to make doubly sure that they are in agreement with and covered by officially accepted labels and labeling. Thus the farmer himself, and the farm advisers and others to whom the farmers turn for counsel and advice will have two sources of reliable information.

● Suggestions on pest control from an entomological expert: (1) read and follow label instructions; (2) control pests and diseases early in the season; (3) avoid use of persistent or questionable materials late in season.

Trouble is most apt to develop when and if growers attempt to use readily available pesticides for unaccepted uses or in an unapproved manner or decide to experiment on their own with new and inadequately tested materials. In the past, many growers have at times taken pesticides in the early stages of their development and used them a bit too freely in commercial pest control operations. In such cases, they did not ask competent research or agricultural extension workers whether or not they should use a material. Actually they, themselves, decided to try the new pesticide, and then merely asked the experts what they knew about it and how it should be used. A continuation of such a practice involves a calculated risk which, however small, must be eliminated insofar as possible. I do not imply that we have been reckless or that we have used the American public as guinea pigs, as has been claimed by some. I am confident that we have not, nor have we in any way endangered the public health. In fact, government statistics show that no group of chemical or mechanical tools in use today has a better safety record than pesticides. Be that as it may, in response to widespread apprehension, the Congress and the federal regulatory agencies have imposed some additional rules and regulations which we must obey.

It will be frustrating indeed when we encounter situations where a specific pesticide is known to be highly effective against a certain pest, but its use cannot be recommended because no tolerance has been established, or the product lacks label acceptance for that particular crop or use. Then, too, entomologists and plant pathologists can anticipate difficulty and perhaps much criticism when they try to convince a grower that when and if he becomes careless and loses control over some pest or pests just before harvest, that is his mistake and he must pay the penalty. However, the conscientious scientist will have no alternative. He must insist that the mere fact insects or plant diseases are threatening a crop in the immediate pre-harvest period does not give the grower license to apply hazardous chemicals that will endanger the health of others. Either some safe procedure must be employed even though it may be more

expensive or less effective, or the crop must be sacrificed.

As I have indicated, or at least implied, qualified representatives of industry may often serve as the grower's best and quickest source of information on the current status of established tolerances and accepted or registered uses for their particular products. However, growers must use some discretion in accepting at face value what these same individuals may have to say about the products of other companies. For example, a representative of the KT company may tell you that the XY company has no tolerance for its product X and that its Y product is not safe to use because it has a tolerance of only 0.1 p.p.m., while his company has a tolerance of 10 p.p.m. on their "Dope." The factual information may be correct, but the way it is presented and the implications given may lead to false conclusions. It may well be that product X is so safe it has been given an exemption and needs no tolerance and it is fully possible product Y with a tolerance of only 0.1 p.p.m. will be safer, more effective, and more economical to use than the competing "Dope" with its highly touted 10 p.p.m. tolerance.

There are those who believe that the tolerances established for two or more pesticides properly reflect the hazards involved in the use of these materials, and you should therefore always choose the material with the higher tolerance. That is not necessarily true. In most cases, the most toxic materials are used at much lower dosage rates, and very often their residues disappear much more rapidly. Thus in many cases, the danger of exceeding the established tolerance will be greater if the pesticide with the higher tolerance is used. Furthermore, the established tolerances do not necessarily truly reflect the relative toxicity of any two or more pesticides. The Food and Drug Administration has always taken the position that whether or not an actual hazard is involved, the amount of a pesticide residue permitted on a raw agricultural product should be held to the minimum required to obtain control of the pest involved. Thus a pesticidal chemical which might be regarded as safe with a residue of 3 p.p.m. (parts per million) may have a tolerance established at only 0.1 p.p.m. because the available performance and residue data show that the pest involved can be effectively controlled, and that the grower can still meet the established tolerance of 0.1 p.p.m.

In some instances, pesticides may have label acceptance for specific uses where there is no tolerance established for the crop involved. In that case, it is normally safe to assume that the matter of residues and tolerances has been considered and it has been found that when the pesticide is used as recommended objectionable residues will not occur.

Insofar as the establishment of a tolerance is concerned, pesticides and pesticide usage may fall into any one of five categories:

1. Exempt from tolerance—safe. (Materials relatively non-toxic to man.)
2. No tolerance because no residue is involved in proposed use—safe as recommended.
3. Specified tolerance of x p.p.m. —safe within specified limits.
4. Zero tolerance—so toxic none will be permitted in food products.
5. No tolerance because of lack of data, etc. (In effect this amounts to a zero tolerance.)

In the case of categories 1 to 4 no serious trouble should result if provisions of the labels and labeling are carefully and conscientiously followed. When materials and uses fall in category 5 it means the safety of the proposed use has not been established and therefore such usage should not be employed in commercial operations.

All this may be confusing. If so, it again emphasizes the fact we should rely upon labels for our final information. In line with the provisions of Public Law 518, pesticide label claims are now registered only after tolerances have been established, an exemption from the need of a tolerance has been granted, or satisfactory proof has been submitted to show that when used as directed on the stated crop or crops no residue will be found on the product at harvest time. Thus, the fact that a material has label acceptance for a specified use is your best assurance that, if properly used, it should meet all residue or tolerance requirements.

In most cases success will come to those who follow three simple rules: (1) Read labels and follow recommended and approved practices to the best of one's ability. (2) Insofar as possible, control insect pests and diseases early in the season. (3) Never use highly persistent or otherwise questionable materials late in the season.

At harvest time, in the fall of 1954, the Illinois Natural History Survey obtained apple samples from 21 Illinois apple orchards for DDT residue analysis. In one orchard, the grower had applied excessive amounts of DDT 10 days before harvest and his crop showed a residue of 8.48 p.p.m., which is 1.48 p.p.m. over the tolerance of 7 p.p.m. The other samples were all well within the tolerance, 18 being less than 3.5 p.p.m., or half the tolerance. The remaining 2 were 4.74 and 5.25 p.p.m. respectively. Since DDT is perhaps the most persistent of the newly developed insecticides, it would appear that with a little care most growers should have little difficulty in meeting tolerances.

In some cases, growers who have strayed from the straight and narrow may have reason to worry and may find it desirable to have a qualified chemist determine the amount of residue on their fruit before it is offered for sale. At the present time, there are very few if any places where such a service could be obtained, but there are a number of commercial laboratories in the state that could, if the demand were adequate, render the service on a fee basis.

Since some of you are interested in animal as well as fruit production, one last observation seems pertinent. The Food and Drug Administration, for the time being at least, insists that it will not establish tolerances for pesticides in milk. That means

(*Continued on Page* 104)

new cotton insecticides

bollweevil resistance

featured at cotton production conf.

in Memphis, Dec. 15-17

A new look at basic approaches to the entire weed problem, and reports on research progress were featured on the program of the first annual Beltwide Cotton Production Conference held December 15-16, Memphis, Tenn. Previously, the Council sponsored separate conferences on insect control, weed control, and defoliation. The new conference replaced these three meetings and included discussions on irrigation, fertilization, and disease control.

Of considerable interest to the entire insecticide industry was the report by C. S. Rainwater, U. S. Department of Agriculture, who announced to the council that the most promising of recently developed systemics is American Cyanamid 3911, which has proved highly effective in controlling early season cotton pests in field tests throughout the south in 1955. Dr. Rainwater advised that this new systemic gives convincing evidence that under certain conditions, when applied as a seed treatment, it can protect seedling cotton plants from insect attacks, and stimulate plant growth. This statement, he said, is based on reports from Arizona to the Carolinas that thrips, aphids, and spider mites were controlled for periods ranging from 3 to 7 or 8 weeks after plant emergence, and individual reports, which indicate that such insects as the cotton fleahopper, whiteflies, cutworms, leaf miners, and over-wintered boll weevils to some extent, were controlled for a few weeks.

He added a word of caution on the handling of Insecticide 3911. "It's extremely poisonous — more poisonous than any insecticide recommended for use today. Carelessness in its use can result in serious consequences." He indicated that it would not be practical, at this stage, to place it in the hands of farmers. Custom treatment of planting seed by trained personnel under carefully controlled conditions is the only safe course. (See Pg. 67).

Concluding his report, Mr. Rainwater said seven new systemics have been found in the laboratory, which are highly effective against aphids and spider mites on cotton when applied as seed treatments. Two new compounds were found which appear promising against thrips, and five which appear promising against the boll weevil.

American Cyanamid Co., New York, held a press conference in the course of the National Cotton Production meeting, at which it was announced that Insecticide 3911 will be known as "Thimus." American Cyanamid advised also that although commercial quantities will not be available in 1956, the new systemic will be available in trial quantities.

Despite reports of the appearance of resistance by boll weevils to recommended insecticides, there is no reason for farmers and the insecticide industry to go into a tail spin . . . Dr. F. C. Bishopp reassured conferees at the first annual Cotton Production Conference. "While there is need for the most careful analysis of the resistance factor," he continued, "there is no cause for alarm." Dr. Bishopp was for many years assistant chief of the BEPQ, US Dept. of Agriculture, and later coordinator of research at the Pink Bollworm Research Center in Brownsville, Texas . . . a post from which he recently retired.

He went on to point out that it is generally agreed that a number of factors aside from possible boll weevil resistance could explain in part the difficulty experienced in controlling this pest in certain areas during the past season. He listed the heavy carry-over of weevils last winter and climatic conditions as prime factors that caused heavy weevil damage in 1955.

"It appears that many cotton raisers didn't take the situation seriously until the first generation weevils were on them, and some paid little attention until even later, when their fields were heavily infested. Every farmer knows that it is practically impossible to make a crop after heavy migration has set in. About all he can expect to do under such conditions is to protect the nearly mature bolls," he asserted.

As for weather conditions, Dr. Bishopp declared these were extremely favorable in many areas for boll weevil development and unfavorable for effective use of insecticides. These conditions may have been equally as important as actual resistance to insecticides.

"We must not lose faith in our proven insecticides and other insect control practices. Let us not sell insecticides short," Dr. Bishopp concluded.

In a further discussion of new insecticides, Dr. A. S. Arant, Alabama Polytechnic Institute, Auburn, Ala., advised that new and more potent insecticides are urgently needed to control insects that damage cotton. Reporting on recent insecticide research, Dr. Arant explained that the boll weevil, the bollworm, and some other major pests still must be controlled with non-systemics.

Dr. Arant said that the chemical known as Bayer 17147 is one of the most promising insecticides developed for the control of boll weevil and most other major cotton pests. Dosage rate, he added, is a quarter of a pound per acre.

Bayer 17147 is a stable compound which remains effective for long periods of time after application to cotton plants, thus reducing the need for frequent applications. It probably will be available to the farmer in small quantities next season. Its trade name has not yet been announced.

Another compound showing promise in controlling the bollweevil, cotton aphid, spider mites and thrips is Bayer L 13/59. Also effective is endrin, but in some areas there is evidence of weevil resistance to this chemical, Dr. Arant added. Use of endrin is still new in some areas of the Cotton Belt.

Controlling Cotton Pests

A panel discussion on "Major Problems and Recommendations in Controlling Cotton Insects," was moderated by H. G. Johnston, National Cotton Council. Appearing on the panel was Dr. Charles Lincoln, University of Arkansas. Dr. Lincoln said that many farmers in limited areas of Mississippi, Louisiana, and Arkansas experienced serious difficulty in control of cotton pests during the 1955 season.

Farmers who were successful, he said, used heavy applications of insecticides at close intervals. He added that technologists at Louisiana State University and at federal laboratories at Tallulah, La., and Stoneville, Miss., conducted studies to determine causes and to try to decide whether the boll weevil is building up resistance to recommended insecticides.

Highlighting cotton insect research in Arkansas, he pointed out: (1) Compound 17147 proved outstanding in control of the boll weevil and "appears adequate" on bollworm, aphid, and spider mites; (2) Heptachlor granules also proved effective against the weevil; and (3) several tests revealed that cotton thrips were controlled by treating seed with insecticide before planting, but attempts to control weevils by the same method failed.

Bad timing and poor application of insecticides caused most of the failures in the Southwest to control cotton insects this past season, according to Dr. Dial F. Martin, Texas A. & M. College, College Station, Texas. Dr. Martin also participated in the panel discussion on cotton insects and said: "We allow certain pests, such as the boll weevil and the bollworm, to become established early in the season before a control program is started. Next attempts are made to increase the interval between applications of insecticides and, if adverse weather intervenes, real trouble develops."

In the case of the boll weevil, which posed a major problem in many areas in 1955, Dr. Martin said, investigation of most of the reported failures revealed that growers allowed weevil populations to increase dangerously before control measures were begun. This, coupled with inadequate dosages of insecticides or too long an interval between applications, failed to produce adequate control. "A successful control program must be started before the weevils get out of hand, and the interval between applications must be short enough so that kill will be obtained during the entire time elapsing between applications. This prevents feeding and egg-laying by adults," he said.

In the case of bollworms, Dr. Martin warned that if the larvae are allowed to develop to the third or fourth stage before control is started, the results will be disappointing. Best results will be obtained, he asserted, if control measures are begun when bollworm eggs and newly hatched worms appear on the plants.

He also reported to the Production Conference that research on pink bollworm has shown the advisability of early destruction of stalks and plowing under the debris, as an effective means of controlling the pest. Associated with this practice should be a program of planting as early as possible to secure good growth and setting of the crop within the shortest possible time. "The main objective should be to produce the crop before the pink bollworm population has had time to increase to the point of causing damage to the green and immature bolls," he concluded.

A series of discussions on weed control and plant disease were received with considerable interest by the Production Conference. Outlining technical aspects of tests conducted on various chemicals recently, Dr. W. H. Tharp, USDA, Beltsville, Md., included a report on the conference on Amino Triazole, which inhibits second growth of plants while causing original leaves to fall ahead of nature's schedule.

Dr. Tharp indicated that "defoliation facilitates harvesting by mechanical pickers, and also helps avoid leaf trash and leaf stain in the lint. It allows air and sunlight to get through to bolls, preventing fiber damage from diseases. Emphasis at this meeting is on fitting defoliation into an over-all production program and considering its relationship to insect control, disease control, weed control, irrigation, fertilization and all other recommended growing practices."

W. C. Dutton, Dow Chemical Co., Midland, Mich., discussed the subject of "The Contributions of the Chemical Industries To Efficient Cotton Production Through Research and Development."

"Chemical manufacturers," said Mr. Dutton, "have shouldered most of the responsibility of checking chemicals thoroughly before they hit markets, so they will be safe and effective for the farmer's use." Mr. Dutton outlined the many steps of the testing procedure necessary be-

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THE SWIFT PROCESS of GRANULATION

*By J. E. Iliff**
Blaw-Knox Co.
Chemical Plants Division

Presented At Fertilizer Industry Round Table
Washington, D. C., October 12, 1955

THIS paper describes a system of producing granular mixed fertilizer. The process differs in many important characteristics from those with which most manufacturers are familiar. The process was developed by Swift & Co. and is now used by it to produce both semi-granular and granular fertilizer. Blaw-Knox Co., Chemical Plants Division, has been licensed by Swift to design, fabricate, and erect equipment to produce fertilizer by this process, and Blaw-Knox is the licensing agent.

The research laboratories of Swift & Co.'s Plant Food Division several years ago* embarked on a program of research with the objective of developing a process and equipment with the following characteristics:

A. High rate of production.
B. Low investment cost.
C. Low labor cost.
D. Low raw material cost.
E. Production of high analysis grades.
F. Complete flexibility in the use of liquid and gaseous raw materials interchangeably with solid raw materials.
G. Use of the heat of reaction to produce a dry product.
H. Virtually complete elimination of nitrogen loss from gaseous ammonia or liquid nitrogen solutions.
I. Improved mechanical condition of the product.
J. Granulation of high nitrogen grades without drying.

*In January 1950 application was made, by Charles Davenport and Walter Horn, for a patent covering the continuous process which was developed, and in November 1952, U. S. Patent No. 2,618,5477 was granted. The process is now in operation at a number of Swift's Plant Food Factories and more units are currently being installed.

Process And Equipment

THE Swift granulation process is adaptable to operation with a batch weighing system. This involves batch weighing, screening, and pre-mixing of the solid raw materials, and is the manner in which the process has been operated. Solid raw materials may also be supplied by continuous weighing, which would eliminate the need for pre-mixing. With the batch weighing system illustrated, dry materials are weighed and discharged to a batch hopper on a definite time cycle. This hopper feeds the two ton batch mixer on the same cycle, and each batch is discharged to the surge hopper. The feed screw to the Swift reactor is equipped with a variable speed drive. The feed screw speed is adjusted so that the pre-mixed material level in the surge hopper is maintained within minimum and maximum limits. In this way, the rate is controlled by the frequency of the preparation of batches, and a constant flow of pre-mixed dry materials is maintained to the reactor.

Liquid raw materials are supplied by pumping or by pressurized storage tanks, and are fed to the reactor through individual rotameters. The reactor is vented through a vapor stack, and the product discharged to storage or to drying, depending on the type of product being made.

The reactor is a rotating shell, 38 feet long by 5½ feet in diameter, set on a 3.75° slope (pitch of 13/16 inch/foot). The speed of rotation is 5.5 rpm. The first 5 foot section of the tube is equipped with spiral flights, which move the dry material rapidly into the lifting flight zone. The lifting flights are 24" long by 8" deep, and 12 are spaced around the inside circumference. The flight pattern is repeated at a 13° stagger to within 5 feet of the tube outlet.

The liquid feed discharges through nozzles directed toward the showering material, in the first 10 feet of the reactor. Hammers are provided to insure that no material sticks to the shell. Vapor is vented from the hooded discharge end by means of a gravity stack through the roof. Vapor tightness at the inlet end of the reactor is accomplished by overlapping the head ring with a stationary head sheet.

When sulfuric or phosphoric acid is reacted with ammonia in mixing fertilizer, a large volume of steam is developed. In a batch mixer, the escaping steam carries with it much of the unreacted ammonia vapor, resulting in substantial losses of nitrogen and local nuisance effects. In the Swift Process, ammonia that does not react in the feed zone travels the entire length of the reactor through a continuous curtain of falling solids, resulting in practically complete absorption of ammonia by the time the vapors reach the exit of the unit. Reaction of ammonia with superphosphates is promoted by the presence of water, and it is believed that the presence of water vapor is a factor in the high absorption efficiency. The spray method of feeding liquids into the solids permits the evaporation of large quantities of water, and the obtaining of a solids outlet temperature of from

200°-250° F through the use of raw materials, which develop a high heat of reaction. This results in a much drier product at the discharge of the reactor, and permits granulation with a relatively small "solution phase," as calculated by Hardesty's method.

Formulation

GRANULATION requires a minimum of about 175-300 pounds/ton of 60° Be sulfuric acid in order to provide enough heat. This amount of acid requires 2.0-3.3 units of nitrogen from free ammonia for neutralization. With a 5-20-20 grade, the degree of ammoniation may be as low as 3.0 lbs. NH_3 per unit APA. For grades containing 6% or more nitrogen, a normal degree of ammoniation (3.50-4.25 lbs. NH_3 per unit APA) can be used. To granulate grades containing 4% or less nitrogen, with economical raw materials, the water content must be increased, and the production rate is therefore decreased for the same size drying equipment.

The mechanism of granulation in this process apparently depends on the formation of a liquid phase containing solids, which have very high solubilities at elevated temperatures. The high temperature thus increases the liquid phase far beyond what would be expected from the amount of water in the formulation. Agglomeration occurs in and immediately following the acid stage of the reactor. Hardening and drying of the granules continues through contact with hot ammonia and water vapors, as the material passes to the exit end of the reactor.

Table I shows the heat developed in the ammoniation of normal superphosphate, triple superphosphate, phosphoric acid and sulfuric acid. The first three were calculated from the data of Hardesty and Ross, as published in *Industrial and Engineering Chemistry*, 1937. The heat of reaction of ammonia and sulfuric acid was calculated from heat of formation data.

Table II illustrates a formulation that can be used in the Swift Process to produce a 12-12-12 grade fertilizer. The tabulation also shows, for the raw materials used, 1) the plant food analysis, 2) the free water contained, 3) the free ammonia which is contained in (plus) or which will react with (minus) each material, and 4) the approximate heat of reaction developed. The degree of ammoniation of the superphosphate is also shown.

To calculate the heat available for the evaporation of water, the specific heat of the dry mixture is estimated at about 0.25 Btu/lb. °F, based on the data of Hardesty and Ross. If the initial temperature is 70°F, and the final temperature 230°F, the heat available for evaporating water is 330,000 Btu/ton—(1981 pounds per ton) x (0.25 Btu/lb. °F) x (230° — 70° F)—(119 pounds per ton) x (1.0 Btu/lb. °F) x (230° — 70° F) = 232,000 Btu/ton. This heat is reduced by radiation losses from the reactor, and in practice it is found that evaporation amounts to 60-100 lbs. per ton, leaving a product containing 1% to 3% moisture.

Table III illustrates a formulation for making granular 5-20-20 by the Swift Process, with the same data. Deducting the sensible heat of solids and water in raising the temperature from 70°F to 230°F leaves 143,000 Btu/ton available for evaporation. About the same amount of water (60 to 100 lbs./ton) is evaporated, also leaving 1% to 3% moisture in the product.

Semi-granular material can be made over a wide range of grades such as 5-10-10, 5-20-20, 12-12-12, 10-20-10, etc., with economical raw materials.

For a very high analysis material, or when prices are favorable, phosphoric acid may be substituted for sulfuric acid, but it is necessary to use a stainless steel reactor to avoid corrosion. The use of phosphoric acid is well worked out since this material has frequently been used when triple superphosphate was unavailable or too high in cost.

TABLE II
12-12-12 Formulation

Raw Material	Weight/Ton Product Lbs.	Plant Food Analysis %	Free Water Lbs.	Free NH_3 Equivalent Lbs.	Approx. Heat of Reaction Btu/Ton
NH_3	119	82.2 N	.....	+119	.....
Solution	50	40.8 N	9	+ 13	.....
H_2SO_4 (60° Bé)	332	.....	73	— 89.5	264,000
$(NH_4)_2SO_4$	593	20.5 N	.....	.....	.....
TSP	457	46.0 APA	28	— 37.0	58,000
NSP	149	20.0 APA	9	— 5.5	8,000
KCl	400	60.0 K_2O	—	.....	.....
	2100		119	0	330,000

Degree of Ammoniation = 3.54 lbs. NH_3/Unit APA

TABLE I
Heats of Reaction

Reactants	End Products	BTU'S Per Unit Of N Reacted
NH_3 + Superphosphate	3.3 lbs.N/Unit APA	35,780
NH_3 + Triple superphosphate	3.25 lbs.N/Unit APA	37,669
NH_3 + H_3PO_4	$NH_4H_2PO_4$	46,214
NH_3 + H_2SO_4	$(NH_4)_2SO_4$	71,500

Operation

THE process is convenient to operate, since it is normally put on stream in 10 minutes. This permits the operation of the process on a non-continuous basis, that is, the system may be operated for as many hours per day as are necessary to meet production requirements, and a variety of grades may be produced during one operating day.

TABLE III
5-20-20 Formulation

Raw Material	Weight/Ton Product Lbs.	Plant Food Analysis %	Water Free Lbs.	Equivalent Free NH_3 Lbs.	Approx. Heat of Reaction Btu/Ton
NH_3	97	82.2 N	.....	+97	.....
Solution	50	40.8 N	9	+13	.....
H_2SO_4 (60° Bé)	185	.....	41	—50	148,000
TSP	736	45.0 APA	44	—49.7	77,000
NSP	345	20.0 APA	21	—10.3	15,000
KCl	667	60.0 K_2O	.....	.....	.....
	2080		115	0	240,000

Degree of Ammoniation = 3.0 lbs. NH_3/Unit APA

The granules, as produced in the reactor, are hard and will retain their identity very well if the material is cooled (without drying) prior to stockpiling. Some evaporation takes place in cooling, of course. However, this method is not as reliable as drying, since the results vary somewhat with the conditions of production and the atmospheric humidity, temperature, etc.

In producing granular fertilizer by this process, the best method to assure the complete absence of caking is drying the material to 1% or less moisture content. In this case, no cooling is necessary, unless it is desired to bag or otherwise manually handle the material as it is produced. No caking results when the material is put in storage at a temperature of 200°F. This system also offers the option of using the dryer as a cooler by cutting off the fuel supply, and saving fuel costs when conditions are favorable for granulation.

Production Rates

USING the Swift Reactor only, without succeeding drying, cooling, or screening equipment, a production rate of 60 tons per hour may be obtained.

Using the Swift Reactor, followed by a cooler, a production rate of 60 tons per hour is also possible, depending on the cooler capacity and the required maintenance of granular form in storage.

For production of a completely granular fertilizer, the equipment consists of the reactor, dryer, screens, oversize crushing, and recycle conveying equipment. The factors limiting production are the capacities of the dryer and screen. Blaw-Knox is prepared to supply standardized units for the production of 15 or 30 tons per hour of —6 +20 mesh granular goods.

Products

Screen analysis of a sample of 12-12-12 taken at the reactor discharge shows:

Mesh Size	%
+ 4	20.8
— 4 +20	61.8
—20 +40	15.2
—40	2.2

which would certainly be satisfactory for sale in many areas without screening.

TABLE IV
Screen Analyses

Mesh Size	12-12-12 %		5-20-20 %	
	(A)	(B)	(A)	(B)
+ 6	5.8	1.8	1.0	0.5
— 6 +10	55.9	31.9	38.0	37.2
—10 +20	35.8	46.5	46.1	48.8
—20 +40	2.3	19.2	13.6	11.6
—40	0.2	0.6	1.3	1.9

Table IV shows two typical analyses of each of two products after screening, when made by the formulations given, and shows variations due to local operating conditions. Screen sizes are 5 mesh and 20 mesh. The amount of material recycled to obtain the particle size distribution shown may vary from 5% to 20%. Screening efficiency is low in some cases, since the production units are being operated at rates exceeding 250% of design capacity at times.

Ordinary 3-ply paper bags (without water-proof layers) are used, and no caking is experienced when granular material is made by drying to 1% moisture or less.

Operating Costs

WHEN this process is operated to produce a semi-granular material without drying and screening equipment as previously described, savings are made in operating costs over a batch system producing a pulverized material. A 2 ton batch mixer system has a capacity of 30 to 35 tons per hour; the same system with the addition of a Swift Reactor has a capacity of 60 tons per hour with the same number of operators.

Operating costs for the full granulation system compare with other granulation systems as follows:

1. Fuel—The cost of fuel for drying the product is greatly reduced since no sensible heat need be supplied to the fertilizer material, and the water to be evaporated is normally only 1% to 3% of the weight of the product.
2. Power—With the elimination of the cooler and its exhaust fan, the reduction in size of the dryer shell and exhaust fan capacity, and the reduction in the total number of pieces of operating equipment, the power costs are lower.
3. Maintenance — Maintenance cost is decreased not only by the reduction in the total number of pieces of equipment, but also in the elimination of the distributor for liquid which operates beneath a bed of material in the TVA process.
4. Labor—Labor costs for weighing and batch mixing are typical of the type installation which may be used. Operation of the ammoniation, granulation, and drying equipment does not require the full time attention of one man.
5. Royalties—When used by producers other than those who own the patent, there is an additional expense for royalty payments.

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R. H. Nelson, executive secretary, George C. Decker, Illinois Natural History, retiring president; B. A. Porter, USDA, newly elected president; and H. M. Armitage, California Department of Agriculture, president-elect.

B. A. Porter Succeeds G. Decker as

WE are rapidly approaching the day of "prescription entomology," members and guests were told at the annual meeting of the ESA, held November 28-December 1st, at the Netherlands Plaza, Cincinnati, Ohio. Dr. George C. Decker, Illinois Natural History Survey, retiring president of the Entomological Society of America, called attention to the specificity of insecticides, unique characteristics, and the highly variable field conditions to be met . . . and thus anticipated a future higher degree of specialization in entomology.

As in previous years, concurrent sessions were held at the ESA convention for various sections, reviewing chemical control investigations; medical and veterinary entomology; biology; extension and regulatory entomology; physiology and toxicology; and general entomology. Highlights of the meeting included a panel discussion on the Miller Pesticide Residue Amendment, a series of motion pictures on Khapra beetle control, mosquito pests, weevil control etc.

At the final business session, officers for 1956 were introduced, as B. A. Porter USDA took over as president. H. M. Armitage, California Department of Agriculture, is the new president-elect, and R. H. Nelson continues as executive secretary. Two new members of the board are C. P. Clausen, Citrus Experiment Station, Riverside and Fred Fletcher, Dow Chemical Co., Midland.

It was announced that the 1956 meeting of the ESA will be held December 27-31 at the Hotel New Yorker, New York City.

Use of Granulated Insecticides

N a series of reports on the control of the European Corn Borer with granulated insecticides, it was pointed out that granular formulations have given as good or better control than spray applications. H. C. Cox, W. G. Lovely and T. A. Brindley reported on formulations, rates, and equipment used, indicating that DDT granules have continued to give good control under extensive testing, and that six other granulated chemicals showed promise in preliminary test work.

Granular Attaclay of the RVM-AA type, tobacco base, and KWK Bentonite are the carriers which appear to be the best for use in preparing granular formulations of insecticides. Experiments to date indicate that more effective borer control is obtained with granular particles in the 30/60 mesh range than with larger size particles. Granules impregnated with 5 percent DDT should be used at the rate of 15-20 pounds per acre, when applied by ground equipment, and 20-25 pounds per acre when applied by airplane.

In a further review of application, Mr. Lovely reported that high rates of application of granules of low concentration give better kills than low rates of application of granules of high concentrations. The most effective method, he said, for timing applications has been observation of leaf feeding.

H. C. Cox discussed the experiments conducted with several types of machines and metering devices for applying the granulated formulations. He indicated that the following equipment was used successfully: a rotor-bar type grass seeder, a conventional fluted-feed grass seeder, a grass seeder with reciprocating chains and a double hopper-bottom, and a modified, fluted-feed grain drill. Conventional row crop dusters were found unsuitable for granular application because the material packs and bridges over in the hopper, and is delivered to the plants in unsatisfactory pattern and at a velocity too high for good deposit. For best results, the granular material should be released in a band 12 to 14 inches wide, approximately 8 to 10 inches above the whorl of the corn plant for first generation borers. He said that equipment designed for air seeding of rice gives the best distribution of granules.

In connection with residues following application of granulated insecticides on corn, a report by J. E. Fahey, H. W. Rusk, and H. C. Cox was presented at the three-day conference, which outlined experiments showing that practically no DDT reaches the kernels inside the husks. However, light residues may remain on leaves, stalks, husks and silks. Such evidence as is now available indicates that DDT residues left on the plants, following use of this insecticide, will not produce ill effects on livestock to which such plants are fed. However, as some of the DDT may be excreted in the milk and deposited in the body

E S A president...

tissues . . . until more information is available on the possible ill effects to man, DDT treated corn should not be fed to dairy cattle.

Khapra Beetle in Arizona

THE actual loss of products due to Khapra beetle in Arizona was not over $10,000, reported W. T. Mendenhall, Commission of Agriculture, Phoenix. However, he said, incidental losses, resulting from control measures, commodity treatments to comply with quarantines and eradication treatments, together with loss of business due to a multiplicity of conflicting state quarantines, unfair trade discrimination . . . and ill advised regulations made by Commodity Credit Corporation, have resulted in staggering losses. Since state and federal quarantines were promulgated, Mr. Mendenhall announced, it has cost the grain industry of Arizona about $20,000 a month for commodity treatments to comply with quarantine. Control measures, exclusive of sanitation programs, have cost in excess of $100,000, and much of this was a total loss due to ineffective measures used.

Mr. Mendenhall announced that before the advent of the Khapra beetle, Arizona had a very lucrative trade in certified sorghum and barley seed . . . amounting to about a million dollars. A large percentage of this trade has been lost, he said, due to the fact that processing houses are infested and seed fumigation is required. Methyl bromide fumigation lowers seed germination, and one firm alone claims over $4000 in adjustments due to lowered seed germination.

In connection with control measures, Mr. Mendenhall reported that malathion has been adopted as the most promising material for control of the Khapra beetle. It is not entirely satisfactory, however, due to its limited residual effect. Sanitation, he said, is still the most effective control, with the exception of methyl bromide fumigation, which is the standard treatment for commodities to be moved under quarantine.

Enforcement of PL 518

AS the 1956 season approaches, manufacturers and entomologists are particularly interested in what to tell the grower, and are interested in knowing what the responsibilities will be in connection with the use of pesticides and resulting residues. Thus the panel discussion on the Miller Amendment found a highly interested audience, with active member participation. Winton B. Rankin, U. S. Food and Drug Administration stated the case for the FDA; John T. Coyne outlined the responsibilities of the U. S. Department of Agriculture, and Lea S. Hitchner, National Agricultural Chemicals Association, reviewed the position of the insecticide producer.

Dr. Rankin reminded his listeners that "There is one element of misunderstanding about the new law that all of us can help clear up. Many people," he said, "are under the impression that this new law sets up some new requirement about pesticides in foods, and that it will render crops in interstate commerce more likely to be seized by the Federal government. As a matter of fact, the new law does not change the basic requirement of the Federal Food, Drug and Cosmetic Act, that foods in interstate commerce shall be free of dangerous quantities of spray residues. This requirement has been a part of the basic statute since it was enacted in 1938. What the new law does is to set up a more convenient method of determining what is a safe residue and announcing this safe level or tolerance level to the public."

Dr. Rankin continued with the observation that when a pesticide tolerance is issued by the federal government it means that:

(1) residues up to the tolerance limit are safe.

(2) the pesticide can be employed usefully without leaving excessive residues.

(3) when the pesticide is used according to directions it will

R. Rings, chairman of the arrangements committee; T. H. Parks, publicity committee; and F. W. Poos, editor of the Journal of Economic Entomology.

Members of the program committee: C. C. Alexander, R. C. Bushland and P. W. Oman, chairman.

not leave residues beyond the permitted level.

"These tolerances have or are being set after much evidence has been accumulated, and with due concern for cumulative effect where small amounts of pesticides are consumed through the months or years. No pesticide traces are allowed in milk.

"The protection of the public health is assured where directions are followed in the proper use of new chemicals in food production. Grower responsibility rests in following the recommendations on the label," he concluded.

JOHN Coyne observed that "The criteria for 'usefulness' are not the same as those required to prove effectiveness under the Insecticide Act. Therefore," he said, "we anticipate that in the usual case, registration will not be granted until the tolerance or exemption has been established, and there is evidence that the resulting residues will not exceed the tolerances."

Several of the problems encountered by USDA in connection with processing petitions under the Miller Law were reviewed in detail by Mr. Coyne. Full consideration of these problems by manufacturers will facilitate more satisfactory handling of tolerance applications. With this thought in mind, the full text of this section of the report by Mr. Coyne follows:

"With respect to the certification of usefulness, we haven't had much difficulty. Most of the uses proposed in petitions to date have been those for which some formulation of the particular chemical previously had been registered under the Federal Insecticide, Fungicide, and Rodenticide Act. This means that the effectiveness of the chemical previously had been determined at the time of registration. In some cases the uses of the chemical have been extended beyond those previously registered but on the basis of use experience, the data submitted and other information which we were able to gather, we have been able, with a few exceptions, to certify the new uses. The greatest certification problems will arise when entirely new chemicals are proposed. This will necessitate an extensive search of the literature and frequent communications with State and Federal Agricultural Research Scientists to gather sufficient data to either affirm or disaffirm the data included in the petition.

"The problems haven't been so easy with respect to our second responsibility —the opinion on residue which the Department must submit to the Food and Drug Administration. The first difficulty we have encountered is that in many cases the residue data submitted with respect to a particular use has been inadequate to serve as a basis for a fair opinion. In some cases there have been no data whatsoever with respect to a particular crop. If the petition shows residue results on another crop in the same family, we have been able in many cases to transfer the application of such data to the crop on which no residue work had been done and thus obtain a basis for our opinion. At other times this problem of transferability has involved crops of such widely diverse characteristics and growing conditions that transferability of residue data was impractical. In such instances we have merely notified the Food and Drug Administration that the data was inadequate to substantiate an opinion with respect to the residue likely to result on the particular crop.

"Another problem that has frequently confronted us is the necessity for extensive projection and supplementation of data. This results from the fact that frequently in the petitions reviewed to date the directions for use and the residue work have not been consistent with respect to the amounts of the chemicals to be used and the interval between last application and harvest. For example, the directions may recommend the use of a pound of a given chemical per acre with a fourteen-day interval between last application and harvest. The residue data on the other hand is based on the use of six to eight ounces of the chemical and intervals ranging from twenty-one to forty days. Obviously, this is not an ideal basis on which to determine what residue would result from the prescribed dosage and application schedule. On the contrary, it requires extensive extrapolation of results to even approximate what the resulting residue might be.

"The last problem which confronts the Department in formulating an opinion on residues results from a propensity on the part of petitioners to propose tolerances on the basis of comparative toxicology, irrespective of differences in dosage, application schedules, and the characteristics of the particular crops on which the pesticide chemical is to be used. On the basis of tolerances previously announced for one chemical, petitioners have rationalized that the chemical for which they are petitioning is of the same order of toxicity, so the same tolerance should apply. This position has been maintained even though the residue data show otherwise, and makes the Department's responsibility in expressing an opinion on resulting residue more difficult.

Industry's Point of View

SPEAKING for insecticide producers, Lea S. Hitchner, observed that the principles incorporated in the Miller Bill were endorsed not only by Industry, but by the leading agricultural organizations in the country and by land grant colleges. He pointed out that it is the policy of the pesticide industry to support sound legislation . . . and that it has supported the Miller amendment even though it involves the expenditure of hundreds of thousands of dollars in order to comply, "even though no evidence has ever been presented showing injury to public health through pesticide residues when pesticides are properly used." While supporting sound legislation," he added, "we are opposed to unduly restrictive forms and vigorously oppose them."

In connection with information on residues, Mr. Hitchner indicated that those interested in research data on residues at the present time can obtain the most authentic information by writing to the basic manufacturers, who have brought together all of the data possible, in order to secure registration and tolerances. Records of the Pesticide Regulation Section of the USDA are confidential, and in order to be made publicly available, possible amendments to the Law might have to be made.

I would like to take the opportunity," said Mr. Hildner, "of pointing out the six categories in which the residue tolerance problem can fall at the present time and on which there seems to be considerable confusion.

1. Some products are exempt from the provisions of the Law because they are not considered a poison or deleterious. Example: Sulphur.

2. Products which have no tolerance established. This category would include materials which leave no residue and therefore require no tolerance. Example: 2,4-D on small grains.

3. An exemption from a tolerance. Food and Drug may exempt materials from a tolerance because of their safe characteristics. Examples: pyrethrum and copper.

4. A product may have a tolerance established in so many parts per million. Example: DDT, which has seven parts per million.

5. A zero tolerance. A zero tolerance would apply when a material can be used but only under such conditions as results in no tolerance when the crop is marketed. Example: Mercury. A zero tolerance is often confused with "no tolerance." Example: (above).

(*Continued on Page* 117)

FERTILIZER PESTICIDE MIXTURES . . .

by H. McVickar

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ALTHOUGH fertilizer-pesticide mixtures have been used in this country for a quarter of a century, it has been only recently that they have attracted widespread attention.

In 1952-53, some 87,000 tons of such mixtures were used. By 1953-54, the tonnage had climbed to 149,000 tons. A breakdown of estimated consumption on fertilizer-pesticide mixtures in the United States and territories is given in Table 1.

Records from fertilizer control officials show that fertilizer-pesticide mixtures are registered for sale in most of the states, and are actually sold in practically every state. In some states, fertilizer laws and regulations do not require that any fertilizer-pesticide mixture be registered specifically as such, while in other states, the registration requirements do not apply to custom mix. Registration of fertilizer-pesticide mixtures is refused in Texas. Information on states and territories in which fertilizer-pesticide mixtures are registered and sold as of the year ending June 30, 1954, is presented in Table II.

On the basis of total consumption of fertilizers, the use of fertilizer-pesticide mixtures accounts for approximately 1 percent of the total consumption of mixed fertilizers. Among the different areas, the proportion ranges from 100th of a percent to over 3 percent in the West North Central and in the territories, and approaches 5 percent in the Pacific.

Source of data: USDA

[a]Presented at the North Dakota Fertilizer Short Course, Fargo, North Dakota, on November 29, 1955.

South Carolina was among the first to use fertilizer-pesticide mixtures in any quantity, and this state continues to be the largest user. It was reported that in 1954, 108,000 acres of crop land received fertilizer-pesticide mixtures.

The Cornbelt states are also heavy users of such mixtures. It is estimated that Iowa used in 1954 the mixtures on 362,500 acres of corn. In Nebraska, such mixtures were applied on 220,000 acres, and in Illinois on 125,000 acres of corn. The use of the mixtures in the Cornbelt is aimed chiefly at the control of the corn rootworm.

The use of insecticides applied in mixtures of fertilizers far exceeds that of other herbicides and fungicides.

Dry fertilizer-pesticide mixtures account for practically all of the current usage, although attention is being given to the possibilities of adding insecticides and herbicides to liquid forms of fertilizer. The principal pesticides mixtures with respect to kinds of pesticides for control of pests on different crops are presented in Table III.

Mixing insecticides with commercial fertilizers creates problems. One of these problems is: Are such mixtures safe? Experimental data fortunately have shown that some of our best insecticides are compatible with common fertilizer materials. Benzene hexachloride (BHC) is an exception.

The mixing of insecticides with the fertilizer creates certain health hazards. With the incorporation of poisonous pesticides, there may be enough dust either inhaled or absorbed through the skin to be harmful to the operator unless special precautions are taken. Fertilizer manufacturers making such mixtures generally provide employees with protective devices of some sort. The advisable procedure is for the fertilizer manufacturer to adopt all health precautions, to prescribe for handling and processing the particular pesticides. The adoption of such precau-

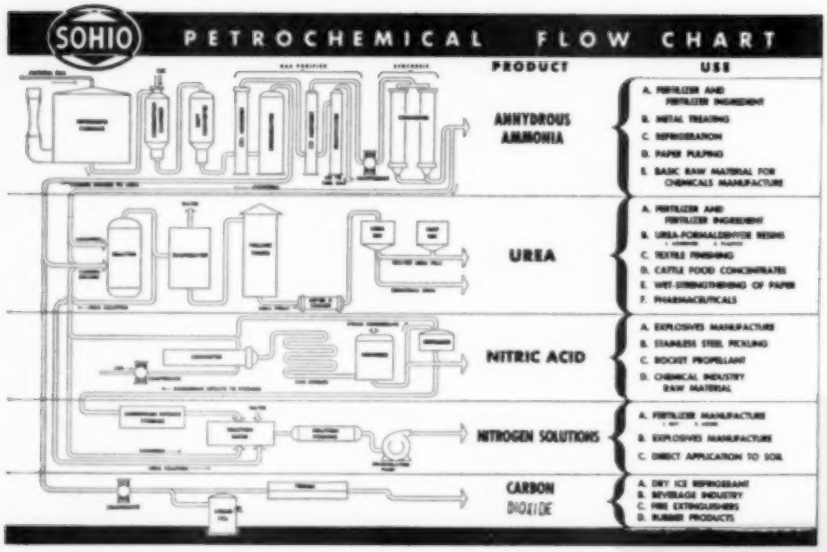
(*Continued on Page 100*)

TABLE 1

States and Territories in which Fertilizer-Pesticide Mixtures were Registered or Sold in Year Ended June 30, 1954, as reported by Fertilizer Control Officials.

Region	Number of States, or Territories		Gross Number of Companies Registering or Selling
	Total	In Which Mixtures Were Registered or Sold	
New England	6	6	18
Middle Atlantic	7[a]	6[b]	20
South Atlantic	5	5	70
East North Central	5	4[c]	9
West North Central	7	7	28
East South Central	4	3[d]	10
West South Central	4	1[e]	1
Mountain	8	5[f]	10
Pacific	3	3	16
Territories	3	1[g]	6
Total	52	41	188

[a]Including District of Columbia which has no fertilizer control.
[b]All units except District of Columbia.
[c]None reported for Michigan.
[d]None reported for Mississippi.
[e]Oklahoma.
[f]None reported for Colorado, Montana, and Wyoming.
[g]Puerto Rico.



Sohio in production

FIRST shipments of products to customers were dispatched in mid-December by the Sohio Chemical Co. from the new $17,000,000 Sohio plant in Lima, Ohio. One carload each of aqua ammonia, urea ammonia solutions, nitric acid, and ammonia nitrate solutions was in the first shipment. Full-scale shipment schedules begin this month. First shipment of urea by the Sohio Chemical Co. is scheduled in February, according to Edward F. Morrill, president.

"Where only a few months ago was a nine-hole golf course, the Sohio plant is now nearing completion as one of the most efficient petrochemical manufacturing plants in its field," states Mr. Morrill. "Construction still goes on, with the last unit, the CO_2 plant, scheduled to go into production in early May. One hundred and eighty men and women will be employed by the new company.

"Lima was the logical choice for the site of the Sohio plant because of the ready availability of raw materials, good railroad shipping facilities, and central location with respect to both agricultural and industrial markets for Sohio petrochemical products."

Sohio's nitrogen products are being sold to manufacturers of dry fertilizers, producers of liquid fertilizers, and for direct application to the soil. The many formulas of ammoniating and nitrogen solutions provide the proper material for the most complex requirements.

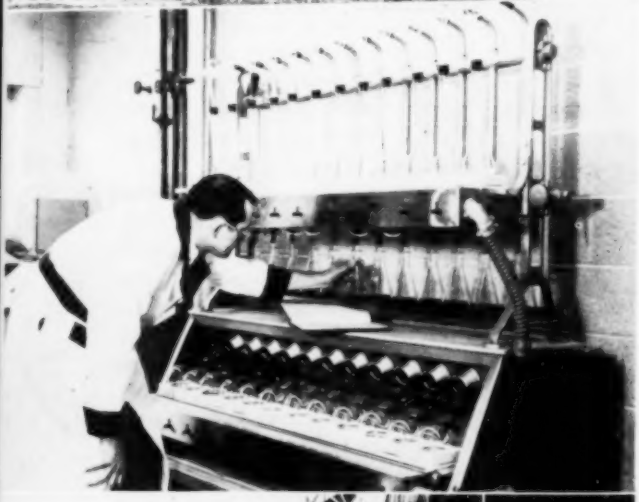
Sohio chemical products to be marketed through agricultural channels include anhydrous ammonia, aqua ammonia, ammoniating solutions, nitrogen solutions, urea fertilizer compounds, and feed grade urea. Sohio offers a selection of 13 varying combinations of ammonia, ammonia nitrate, and urea in the Sohiogen and Sohiogro solution line, the most complete choice offered from any source in the country, according to H. J. Coleman, sales manager.

A major portion of Sohio products marketed through industrial channels include refrigeration-grade ammonia, aqua ammonia (A-grade), urea, and nitric acid 36 to 40° Be.

Ample storage facilities for ammonia, ammonium nitrate, nitric acid, and urea have been provided at the Lima plant to enable Sohio to build up reserves of products before the start of peak season shipments, so normal shipping capacity can be substantially increased if necessary during critical high-consumption periods. These storage facilities, Sohio advises, will assure an adequate supply for the fluctuating agricultural demand.

Sohio's new petrochemical plant consists of five process units, an office headquarters building, a laboratory building, a locker building for plant employees, a steam plant, and an electrical sub-station. The process units

View of new Sohio anhydrous ammonia plant at Lima, Ohio.



Every operating unit in the Sohio petrochemical plant has its own small laboratory to provide close control on operations. Here a Sohio chemist uses a Kjeldahl rack to check nitrogen content of a solution.

These four storage spheres for ammonia are of high pressure steel design. They are of ample capacity to permit storage of off-season production.

are: the ammonia unit, the nitric acid unit, the urea unit, the carbon dioxide (dry ice) unit, and the solutions blending unit.

In the primary unit the steam methane process is used for the production of ammonia. In this ammonia unit, air, natural gas and catalytic reformer gas are run through a reformer unit to produce nitrogen (from air), hydrogen (from gas), carbon monoxide and carbon dioxide. The CO and the CO_2 are removed and the nitrogen and hydrogen run to a synthesis unit where ammonia is formed. Approximately a third of this ammonia is sold as such and the remainder is further processed to make nitric acid, solutions and urea.

In the nitric acid unit, ammonia is burned to form nitrogen oxide. Water is added, by-products are removed, and nitric acid is produced. About a third of this unit's production is marketed as nitric acid. The remainder is used to make ammonia nitrate solutions.

The urea unit uses the Inventa process. Here ammonia and carbon dioxide, produced in the ammonia unit, are combined to form urea at very high pressure and moderate temperature. Urea is first derived in the form of a solution. A portion of the water is evaporated and the resulting concentrated solution is charged into a very tall tower and sprayed as droplets from the top. Air is blown into the bottom of the tower and flows upward. As a result of this air movement, the droplets fall slowly to the bottom and in the process solidfy into small spherical particles. The prilled urea is then coated with a dusting compound to prevent it taking on moisture and caking.

The carbon dioxide consumed in the making of urea goes to the dry-ice plant where it is made into dry ice and liquid carbon dioxide.

Like most petrochemical manufacturing enterprises, the large percentage of products from this new plant will be used as raw materials by other manufacturers, a high percentage of them in the fertilizer field.★★

The Manufacture of

Liquid Fertilizers

*By R. B. Ellsworth**
R. B. Ellsworth & Associates
Indianapolis 4, Indiana

MANY articles have been published on the pros and cons of complete liquid fertilizer in the past few years. Now, several manufacturing plants have proved to be successful in supplying complete liquid fertilizer to farm areas, so information regarding the building of the manufacturing plants may be timely. The following steps are suggested to proceed in this direction.

Inquiries should be made of two or three companies offering equipment and engineering services for building manufacturing plants. Answers to the following questions are important. Where are the plants that might be visited? For how many plants has the company been responsible? How many years of experience has the company in this particular field? Is engineering provided as well as the equipment? What are the basic costs of the raw materials for formulating the various ratios? Is a chemical laboratory service available for developing new formulas and for assistance in case of trouble with formulas?

The next step would then be to visit at least three plants and talk to the management. Be sure to visit meter-operated plants, both manual and automatic types, which are located particularly in Indiana, Illinois, and Ohio. The Hydro-Cycle System of manufacturing probably is the fastest, most versatile and accurate method of manufacturing now being used. Also visit plants using, exclusively, weighing scales. You will find that the plant investments vary from $10,000 to $100,000.

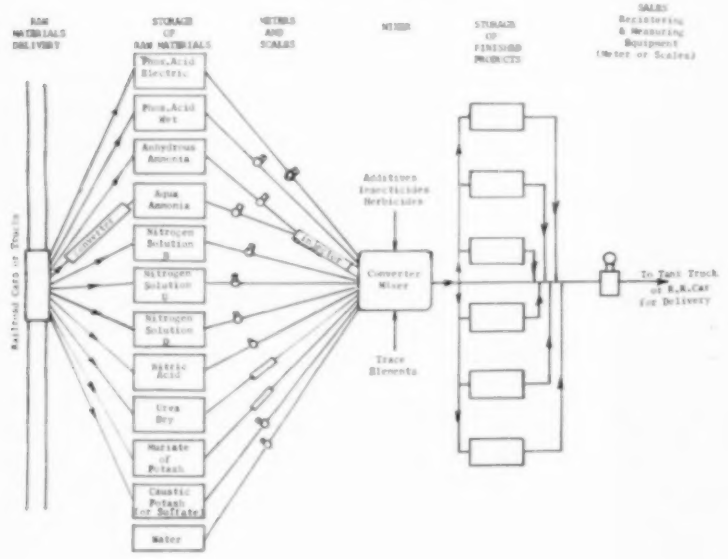
Do not expect the owners of these plants to offer a great deal of information of a confidential nature, because they will not know whether or not you may be a future competitor. Then too, there are literally hundreds of people making the rounds of these plants, and it becomes somewhat of a burden to give each visitor time.

The next important phase to investigate would be the method of distribution and the applicating equipment. There are three general methods being employed for distribution. Some plants distribute entirely on a wholesale basis through custom applicating dealers. Other plants are equipped to sell on a retail basis, doing all the applicating and delivering. Then, there are other areas where the distribution is set up on a "do-it-yourself" program, with storage on the farms. Each method or combination of methods has its advantages or disadvantages in each particular territory.

A few suggestions regarding financing this new industry may be of interest. The manufacturing equipment for an initial plant can be had for about $10,500. This is not, necessarily, a complete plant, but is usually satisfactory for the first year of operation. Then, additional storage and refinement in the operation can be added later, such as is suggested by the Hydro-Cycle System. The manufacturing plant will require about one-fourth acre of ground on a railroad siding and with a good water supply. The prospective manufacturer may have sufficient operating capital to start the business, but sometimes it is more convenient to obtain operating capital on a short term loan basis from the local banks. The local banks will quite often work out arrangements for credit not only with the manufacturer, but also with the farmers purchasing the fertilizer.

The prospective manufacturer will accumulate a considerable amount of additional information in following the above procedure of investigation which cannot be enumer-

NPK Liquid Fertilizer



*R. B. Ellsworth, president of the Hydro Liquid Fertilizer Corp. at Converse, Ind., president of the Wayne Nitrogen Corp., Fort Wayne, Ind., with his own office in Indianapolis where he operates R. B. Ellsworth and Associates for engineering and constructing liquid fertilizer plants.

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Agricultural Chemicals

Still An Opportunity

by **Donald R. Gibbons**
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Cambridge, Mass.

THE 1955 agricultural chemical season has come to an agreeable end for most concerns. Not until this year did the sale of agricultural chemicals reach the 1951 peak. Many of the chronic problems including excessive price cutting among competitors, the unprofitability of agricultural chemicals, and the large inventory carry-overs, were less serious this year. But, despite the success of this season and the prospect of an even better season in 1956, the industry's market has not basically changed. Years of low infestation, low demand, and low profits are certain to recur. These poor years cannot be predicted, since the sale of most agricultural chemicals is indirectly dependent upon the weather. Everybody knows that each year's weather is most unusual and exceptional.

This is the time to consider how a company can insure its future in the agricultural chemical market. Now, when the agricultural chemical department's earnings are more favorable than they have been in the past or may be for some years in the future, is an opportune time to budget the funds necessary to maintain and further increase profit margins. The funds can find many uses—tightening dealer distribution, improving promotion and production efficiency, and developing profitable specialties.

A company must develop specialties to participate successfully in the agricultural chemical market and to insure a steady and profitable business. Good patent protection of the specialties will permit the company to control its products' distribution and selling price. To sell a unique product better than any competitive item on the market is the ideal. Ideal specialties are not easy to find. Research is the vital tool. Well directed, consistent research will ultimately pay off in new products and profits. The critical question is: what should be the subject of the research?

Consider for a minute the agricultural chemical market. We are often made aware of the fact that from today's 164.5 million population to over 200 million by 1975, acreage will increase little; farm population will decrease. Greater productivity per man and per acre will be needed. When thinking in these terms, we are apt to lose sight of the individual farmer. After all, the farmer, not the agricultural community as a whole, buys the agricultural chemicals. The farmer is basically in the business to make a profit; he will look with interest upon, and will ultimately purchase any demonstrable means of lessening his physical burden and of increasing his profit. Most any farmer will invest $1 in agricultural chemicals if he is reasonably confident of a $5 return. Since the cost of application is an additional 80% of the cost of the chemical, these farmers are apparently willing to spend almost $2 for every $5 gained.

The fact is that the potential agricultural chemicals market is far from saturated. Obviously, some farmers have not concluded that a $2 investment for a $5 return is a good one; perhaps they are unaware of the practical value of agricultural chemicals. How to keep the farmer informed of new developments in agricultural chemicals and how to educate him in their proper use are profitable subjects for thought.

With the immediate prospect of restrictions on acreage planting and with the long-range prospect of a high demand for agricultural products, the individual farmer wants his land to produce as much as possible. Since the depth of the depression of the early thirties, output per man hour in agriculture has increased much more rapidly than output per acre of crop land. On the basis of the U. S. Department of Agricul-

ture's old index of 100 for 1935-1939, the 1952 output per man hour reached 173, while output per acre had reached only 133. Much of the increase in productivity per man is due to the rapid mechanization of farms during the last 20 years. Although agricultural chemicals have to an extent, and certainly will to a greater extent, aid in increasing productivity per man—for example, the use of herbicides to eliminate extra corn cultivation—their largest potential is in increasing yields per acre of crop. Here insecticides have shown their value, and here lies the great future of agricultural chemicals: increasing yield and improving quality.

Taking the Agricultural Research Services' "Losses in Agriculture" (1) and assuming that a farmer will spend $1 for an agricultural chemical if he can get a $5 return, we can estimate the present and potential consumer markets for agricultural pesticides. The present annual pesticide market is estimated at $440 million, compared to a potential of $2,600 million to control losses of $13,030 million annually. 17% of the total potential market for pesticides—products that prevent losses due to diseases, insects, and weeds—has been realized.

The control of crop insects with 37% of the potential realized, is much more advanced than other uses of agricultural pesticides, partly because of the dramatic effect of watching one's crop being destroyed by a horde of insects, more importantly because cheap and effective means of controlling insects have been available to farmers for a decade.

Animal diseases are relatively under control. The veterinary houses have been able to offer effective products for many years and have realized 30% of their potential market. Furthermore, since the farmer's hog or heifer is a substantial investment, and he can ill afford to let it die, he takes immediate action when he thinks its life or value is threatened.

Control of plant diseases (9% of potential) and weeds (5% of potential) may not have developed to the same extent simply because suitable or practical means have not been available. Often the farmer has not realized that his losses are due to disease or weeds. Since weed and plant-disease controls appear to be the least developed of all of the agricultural pesticides, they seem to offer the greatest potential for further growth and represent a most fruitful area for long-term research.

This is the pesticide market. But the pesticide market is not the entire agricultural chemical market. Even though we are excluding fertilizers from this discussion, we can envision an increased demand for growing and harvesting aids such as desiccants, and hormone-like products that change the character of plants—a demand that may ultimately offer a potential far greater than that of the pesticide market.

Let's take a few examples of the type of specialties—pesticide or harvesting aids—that are needed. Applying agricultural chemicals is rather complicated. In general, it involves the purchase of a spray rig with a metering pump that insures even spreading of the correct amount of spray per acre. If the agricultural chemicals involved are noncompatible, the farmer must use more than one spray rig. For obvious reasons it is undesirable to mix herbicides and insecticides. As a result, it costs the farmer almost as much to spread the agricultural chemicals as it did to buy them. If a simpler way can be developed for single or multiple application of agricultural chemicals, the market would grow rapidly. A simple method would save the farmer time and, if the spray rig could be eliminated, would reduce his capital expenditures. Certainly fertilizer-insecticide mixtures and pelleted insecticides are steps in this direction. Seed coating, already causing some excitement in the industry, seems to offer a particularly basic approach to this problem. It is conceivable that within a decade, seeds will be coated with layers of all the agricultural chemicals needed to combat pests, to increase the plant's fecundity, and possibly to change the plant's properties.

Systemics offer great possibilities for the control of insects, fungi, bacteria, and viral diseases, not only in plants (what is an antibiotic if not a systemic?) but also in animals. The development of products capable of repelling insects, nematodes, or other pests might solve the problem of insect resistance, which has decreased the effectiveness of many chlorinated hydrocarbon and phosphate insecticides. If the insects were repelled, there might be no selective "survival of the fittest," which seeems to be a factor contributing to the development of resistant strains of insects.

There is a great need for a cheap, effective fungicide; a market for it exists, among other places, in the wheat country. Desiccants and other harvesting aids that decrease losses during and after harvest offer large, relatively untapped markets. Sodium bisulfite may be the forerunner of a number of such harvesting aids; its application is an excellent example of a new use for an old product. Have you ever thought of reviewing your company's old patents in the light of today's ever-changing needs, to find whether they offer a possible solution to an agricultural problem?

There are also many opportunities in the development of chemicals that can change the physiological structure of plants—for example, maleic hydrazide. Ways of reducing the height and increasing the girth of timber, of increasing the yield of wheat by means other than the development of hybrid strains, or of increasing the sugar content of sugar cane represent attractive potential markets outside the field of pesticides. There are a multitude of such possibilities.

In this article we have covered a broad field; the markets are large and present many opportunities for a company to assure itself of a profitable business in agricultural chemicals. The trick is to recognize the problem, the individual farmer's problem, and to find the solution.★★

References

1. "Losses in Agriculture, a Preliminary Appraisal for Review." Agricultural Research Service, U. S. Department of Agriculture, June 1954.

Insect Surveys

By Kelvin Dorward

INFORMATION as to insects, their whereabouts, their numbers, damaging effects, and control, is of vital importance to the diversified agricultural production which is necessary to feed and clothe our ever-increasing populaton. Surveys are the media for furnishing such information to entomologists, plant quarantine officials, county agents, farmers, insecticide and related industries, or any other person desiring such knowledge. Surveys properly conducted provide information on location of the insect, extent of the infestation, degree of infestation, and damage being caused, as well as an indication of the damage which might be expected. In the case of some insects, surveys have been developed which forecast expected population, for the following season.

The proposed use of insect survey information dictates largely the type of survey to be conducted. Some surveys are for the purpose of obtaining information on the entire insect fauna of a certain area. Another survey may be conducted on one specific insect for quarantine purposes, while still another may be for the execution of a specific control program. Quite often, the surveys are of such an overlapping nature that it is difficult to determine when the survey passes from one category to another.

Faunistic surveys are conducted to determine the entire insect fauna of a given area, without regard to the economic importance of the species collected. Such surveys are extremely important, but unfortunately are not as widely conducted as would be desirable. Time, personnel, and finances too often limit the thorough work necessary. Regardless, several states, including Connecticut, Kansas, New Jersey, New York, and North Carolina, have published rather complete lists of insects, and others have long-range plans for a complete study of the insect fauna within the state.

A modified faunistic survey was conducted in the general vicinity of ports of entry during World War II. The U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, initiated this project to determine if any new economic agricultural pests were being introduced into this country because of increased traffic from foreign countries. Cultivated crops and related wild plants in the vicinity of shipping points were inspected thoroughly. During the survey, in operation from 1943 to 1945, 32,000 lots of specimens were submitted for identification. From these specimens, 41 known species never before recorded in this country were discovered. Only seven of the 41, however, were considered to be of economic importance in foreign countries, where they probably originated. The survey also established new state distribution records for at least 33 species, previously known to occur in other areas of the United States. Also collected, were 46 species not previously known to science and 82 species which were probably not known.

The operation of many federal and state quarantines requires specific surveys. They may also involve insect control activities, but have as their primary objective locating and delimiting infestations of a specific insect for the purpose of quarantine modification. These surveys are continued from year to year, and may show that such infestations have spread or, through regulatory or control measures, have been more restricted or even eliminated.

In the Plant Pest Control Branch, Agricultural Research Service, the white-fringed beetle control program, the gypsy and brown-tailed moth programs, and the Japanese beetle program are among those which conduct surveys each year for both quarantine and control purposes.

Very closely allied with the surveys for insects already under quarantine are those conducted to determine the advisability of invoking a quarantine. A recent example of a survey conducted to determine the feasibility of a quarantine was carried out in the western states to determine the distribution of the khapra beetle. Further reference to this survey will be made later in this discussion.

Control programs are dependent upon survey information in order to plan an effective program. The grasshopper control program is a very good example of a project that is based and executed upon survey findings. The adult and egg surveys, conducted by Federal and State workers during the late summer and fall

months, are the basis for the initial planning for the following season's control activities. If federal and state grasshopper control programs are necessary, it is from this information that the estimated costs are determined. Further surveys are conducted in the spring to determine if the expected populations have developed or may develop. Checks are also made to determine the effectiveness of control measures if they have been applied.

Directly connected with surveys conducted for insect control are those which are often termed prediction surveys. These surveys are usually conducted on certain insects in the late season of one year to supply outlook information on these insects for the following year. The fall grasshopper survey just discussed is definitely a prediction survey. An indication of the potential boll weevil problem during the forthcoming season is made possible by a fall boll weevil hibernation survey. Samples of woods trash in which the weevils may pass the winter are collected, and the number of hibernating weevils counted. Similar collections are made early in the spring to determine the percentage of weevils which survive the winter. The fall survey conducted for the European corn borer, in which corn stalks are examined for larvae, provides data on populations going into hibernation, as well as defining the areas of various levels of population. Fall surveys are also conducted for hibernating chinch bugs, to indicate whether or not trouble might be expected the following year. There are other prediction surveys, but more and better methods are needed. Too, there are many factors which make insect predictions very sensitive. Rain, drought, hot or cold weather at critical times can almost completely reverse predictions. Potential heavy populations may be almost completely destroyed, while extremely favorable conditions for the insect may permit a small potential to develop into a serious problem very quickly. However, even with the pitfalls of insect predictions, entomologists keep working to determine how it will be possible to give, with some degree of accuracy, advance information as to expected insect infestations.

During World War II years, special insect surveys were undertaken on insects affecting certain crops, to help insure the greatest possible production of those essential food, feed, and fiber crops. Such surveys not only aided in the proper distribution of scarce insecticides, but also served as a means of informing farmers, county agents, and other interested agricultural workers of insect conditions as they related to the crops concerned. These surveys became known as service surveys and included surveys relating to insect pests of cotton, truck crops, fruit, and the European corn borer. In 1946, these surveys were responsible for timely distribution of insecticides to points of shortages in various parts of the country. Information on nicotine sulfate supplies made possible the tranfer of materials to Wisconsin, Michigan, Louisiana, and California at critical times for aphid control on fruits and vegetables. At another time, vegetable oil was made available to prepare DDT emulsion needed for potato aphid control on tomatoes in western New York and northwestern Pennsylvania. An outbreak of velvet-bean caterpillar in the southeastern states brought warnings to insecticide manufacturers, who immediately made cryolite available to the area. The bean crop in western North Carolina and northeastern Tennessee was similarly protected by rotenone being made available to protect against the Mexican bean beetle. Farmers in these North Carolina and Tennessee areas were also able to prepare for corn earworm control on their beans by being warned of a potential outbreak of the worm. This type of insect survey not only helped to insure distribution of short supplies of insecticides, but also provided farmers with information dealing with their current insect problems. These surveys developed into such an integral part of farming in many of the areas in which conducted, that they were continued on a limited number of crops following the war years. It became the desire of many, however, to extend to other crops and areas a program which would provide information on general insect conditions.

In order to extend the service type of survey, it was necessary to realign the funds which were being expended, as well as to make adjustments in the survey procedures. It became one of the functions of the Economic Insect Survey Section, Plant Pest Control Branch, USDA, to develop the expanded program. The program united closely with the objectives of the Section, which was created in 1952, to bring together current insect condition data and make it available on a nationwide basis. The original concept of the Economic Insect Survey Section was to publish reports on insect conditions originating from entomologists and other agricultural workers on a voluntary basis. With the sanction of the Entomological Society of America Survey Advisory Committee and several state workers with whom the plan was discussed, a program evolved whereby the USDA Bureau of Entomology and Plant Quarantine would enter into an agreement with state entomological agencies to furnish up to 50 percent of the cost of maintaining one survey entomologist in a state during a designated survey period. (Since reorganization of the U. S. Department of Agriculture in 1953, this function is in the Plant Pest Control Branch, ARS.). Not only would the survey entomologist make field surveys, but would also help develop and maintain the voluntary phase of the program. Twenty-four states have signed cooperative agreements, and the signing of the twenty-fifth is pending.

During the 1954 season, more than 600 individuals voluntarily contributed notes on insect conditions for use in the weekly national release "The Cooperative Economic Insect Report," or to be recorded in the permanent files of the section. Many states make use of weekly releases to advise agricultural interests of insect conditions within the state and to warn of possible migrations from

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Fertilizer Round Table...

Part 3
Conclusion of a report on the meeting of the Fertilizer Round Table held in Washington, D. C. on October 11-12.

A Fertilizer Graining Agent

THE production and properties of a natural colloidal kaolinitic kaolin were reviewed by M. W. Thomas, Thos. Alabama Kaolin Co., who told his audience that the product has been found a useful and economical agent in pelletizing, or as a graining agent in the production of fertilizer . . . or as a diluent in insecticides. The material in crude form, said Mr. Thomas, is very pure, containing a small percentage of iron . . . less than 1 percent, and averaging approximately ½ percent. It is low in alkalies, soda, and lime, and contains no mica.

The chemical analysis of kaolin shows it to be 99.6% a pure kaolinite . . . and the x-ray pattern gives a true kaolinite pattern. Properties are as follows:

bulk density (lbs./cu. ft.)
loose: about 20 lbs.
packed: about 41 lbs.
porosity: 130%
specific surface: cm^2-22,700
specific gravity: 2.62
particle type: crystal rectangular plates and crystal aggregates
limiting particle size: .01 to 90 microns
absorption of moisture from air when exposed in open vessel at average room temperature with "Tako" dried to absolute zero:
24 hrs., 9/10 %
7 days, 1 %

The kaolin is mined by selective methods and transported to a processing plant, where the crude ore is air-dried, passed through mills and grinding equipment which transform the fine material to a product with a flat rectangular surface. This form of the product is reported to be particularly suitable to blending in the insecticide field, and to pelletizing in the manufacture of fertilizer. The finished product generally has a free moisture content of .7 to .8%.

In discussing its storage properties, and moisture content, Mr. Thomas reported that in a test case, "Tako" (tradename for kaolin processed by Thos Alabama) stored for a period of one year showed no change in flowing properties . . . had not caked or packed. The moisture content increased only slightly, from .7% to 1%. He reviewed also the production methods of mining and processing "Tako" for distribution, and presented data on physical properties and particle size.

In connection with particle size, Wayne King, W. S. Tyler Co., Baltimore, presented some factual information on the effective use of screens in production of fertilizers. With the increasing interest in granulation . . . and granular fertilizers, production men at the Round Table presented several questions to Mr. King on determining product size, and optimum angles of screen installation.

Further theories of granulation, and particularly, operations at the Ark-Mo plant of Spencer Chemical Co., were reviewed by Joseph Sharp of Spencer. Mr. Sharp presented a series of illustrations featuring the material flow at the new Spencer granulation plant, together with equipment installations, etc. The granulation process used at this plant was developed jointly by Spencer Chemical Co., Kansas City, Mo., and the Ark-Mo Plant Food Co., Walnut Ridge, Ark. In experimental runs, Ark-Mo has been successful in producing a 14-14-14 which derives all the nitrogen from a 37 percent nitrogen solution. The company hopes to develop shortly complete data on other grades of fertilizer . . . a 1-4-4 ratio, for example. The critical factor is accurate control throughout the process. Automatic control of material flow, together with automatic recording of temperatures at various locations aid the system.

Edwin C. Kapusta, U. S. Potash Co., New York, presented some ideas on the role of potash salts in the ammoniation and granulation of mixed fertilizers. "Although dating back in origin many years," said Mr. Kapusta, "the greatest progress in the development and application of granulation processes has been made in the past few years. The popularity of granulation is evident by the large number of plant conversions and construction of new units currently taking place in the industry. It is estimated," he continued, "that over 100 mixed fertilizer plants either have installed or are installing some form of granulation equipment. Manufacture of granular mixed fertilizers may approximate up to 15 percent of the total domestic production of mixtures in the coming fertilizer year."

Continuous granulation-ammoniation at two Virginia-Carolina plants was described by E. Leister, Edw. Renneburg & Sons Co., Baltimore, who outlined the combination operation, giving details on each unit. "A wide range of flexibility can be built into a continuous combination unit," reported Mr. Leister, as he listed the following advantages:

a. Any retention time can be had for the varying grades of material, by the use of retaining rings or the variable inclination feature.
b. Speed of rotation can be increased easily, or decreased by the use of variable speed drive, or by changing a V-belt sheave.
c. Bed depth can be controlled, which can have a great effect on the loss of ammonia.
d. The unit is designed to permit use of any of the following: an-

(*Continued on Page* 100)

'Airplane Hangar' arch-type wooden

FERTILIZER BUILDINGS

resist hurricanes, corrosion, provide unobstructed space

End wall truss construction for the arch-type fertilizer plant at Sioux Falls, S.D. is shown in photo. The plant was built by Summers Fertilizer Co., which has its headquarters in Baltimore. It is made of wood.

FERTILIZER formulators and mixers always have to contend with the problem of corrosion caused by atmospheric moisture and fertilizer dust. In addition, during the last two years, formulators along the Eastern seaboard have had the additional devastating effect of a series of violent hurricanes, for which they were largely unprepared. In one of these hurricanes, a fertilizer plant in Maine lost most of its roof and siding.

That was not the case, however, with the nearby plant of Northern Chemical Industries, Inc., an affiliate of the Summers Fertilizer Co., with headquarters in Baltimore, Md. The Northern plant, constructed in 1944 at Searsport, Me., was undamaged because the high winds rolled harmlessly over its arch-type roof.

It is this arch-type roof that is the key to the "Airplane Hangar" design building which Summers has found to be strong and efficient. The Searsport plant is made of wood, with laminated arches supporting the roof.

Used It On New Plant

LAST year, when Summers was planning a new unit at Sioux Falls, S. D., it decided on the arch-type wood construction without hesitation. The hurricane experience at the Maine plant was an important factor influencing this decision. But equally important was the very low maintenance costs of the Searsport building compared with the upkeep costs of a conventional steel fertilizer plant Summers constructed at Grand Forks, N. D., in 1949. Fertilizer took its toll of corrosion in the steel plant, but had practically no effect on the wooden structure in Maine. Summers officials report that the Searsport buildings "have been in use

Trusses going into place at Sioux Falls plant.

Roof deck of "airplane hangar" plant in place.

more than 11 years without any expense of maintenance such as is normally found in fertilizer factory buildings."

The Searsport plant includes a sulfuric acid and superphosphate plant. The phosphate rock storage, the mill room, acidulating room and the superphosphate storage buildings all were made from wood, using "Rilco" laminated arches. The superphosphate storage is 120 feet wide at ground level, with arches 43 feet high at the center. These arches are considerably lighter than concrete arches.

Floor Space Entirely Open

ASIDE from the strength and the corrosion resistance of these hangar-type plants, they have another advantage: the floor space is entirely free from any roof supporting columns. Of course, this desirable feature can be obtained also with steel or reinforced concrete arches, but these materials are subject to rapid corrosion.

The new building at Sioux Falls, incorporating the advantages of the Searsport plant, was designed by Crout, Snyder and Crandall, Baltimore engineers, in collaboration with Rilco Laminated Products Co., of St. Paul, Minn. It is 100 feet wide, 300 feet long and 48 feet high at the center line. Light weight trusses, preformed and laminated, placed on 10-foot centers, were used. These trusses were designed and built in two sections joined at the time of construction with tie-plates and bolts at the top of the arch. By using the lightweight trusses on 10-foot sections, it was possible to avoid the use of purlins. The roof decking is two-inch tongue and groove, 20-feet long, except for a few 10-foot pieces, (so that the joints in the roof decking are staggered). The roof decking serves to tie the arches together.

An important element in the design of the building (shown in the photographs on these pages) is the end wall truss. Four of these trusses are installed at each end of the building so that the wind pressure can be absorbed without deflection to the structure iself. Winds up to 70 m.p.h. have been experienced at Sioux Falls without any noticeable movement of the building, according to Ralph E. Fraser, vice president of Summers.

The Sioux Falls plant needed bulkheads for separation of various materials. These were installed using heavy steel columns and conventional bookshelf partitions. The bulkheading is independent of the building structure, thus avoiding transmission of weight strains and vibration to the building itself.★★

Arch-type fertilizer plant of wood is nearly completed at Sioux Falls. Arches are of laminated wood. The building is constructed to resist high winds and to withstand the corrosive effects of fertilizer dust and atmospheric moisture. It was designed to incorporate the many advantages of this type building found in the Summers plant at Searsport, Me. which is 11 years old and has proved to be an efficient setup for fertilizers.

FERTILIZER
Views and News

By Vincent Sauchelli

Corrosion Caused by Fertilizers

ENGINEERS in the fertilizer plant and their colleagues in the farm equipment industry are confronted with corrosion problems induced by fertilizer materials and compound fertilizers under certain conditions of use. The subject of corrosion by fertilizers was discussed several months ago in London at a conference organized by fertilizer interests and British agricultural engineers. This problem could very well be on the agenda of conferences in our own country at which agricultural engineers and fertilizer plant operators could discuss their mutual problems and possible solutions. Perhaps we shall include it in the 1956 Fertilizer Round Table agenda. Some echoes of the London discussions on the corrosive properties of the specified fertilizer materials which follow indicate the kind of information needed to a greater degree by our industry. They appeared in a brief summary prepared by a Mr. W. D. Clark:

Ammonium Sulfate:

It has a slightly acid reaction and some ability to penetrate protective films. It is not an oxidizing agent, and the attack on the copper alloys is due largely to formation of blue cupramine compounds. The film on aluminum bronze is, however, able to prevent significant attack. Aluminum itself being inherently more reactive, suffers greater damage than the aluminum bronze. Lead and Austenitic steel are completely resistant.

Ammonium Nitrate:

It is more acid and more corrosive than ammonium sulfate. It is particularly corrosive to lead and liable to cause serious damage to mild steel by stress corrosion cracking. Its oxidizing power makes it non-damaging to those alloys which have a good oxide film, but does not increase its attack on copper alloys to any significant degree.

Ammonium Chloride:

Its corrosive power is much more severe than the two previous ammonium compounds. Indeed, its high corrosive property prevented its general production and use as a fertilizer material. Even Austenitic steel could not be reliably used in contact with it. (We must remember that ammonium chloride is, however, formed in many formulations in which ammonia liquors and muriate of potash are caused to react in the mixture. V. S.)

Mono-Ammonium Phosphate:

This is an acid material but attacks only lightly, probably as a result of the formation of films of basic phosphates.

This is not very acid in reaction and cannot be considered an oxidizing agent. However, it is apt to penetrate surface films. Accordingly, it corrodes away metal only at a slow rate, with the exception of aluminum; in this case the limited amount of corrosion occurs at restricted places and shows up as pits which may be quite deep.

Sulfate of Potash:

About the same as the muriate but with much less pitting.

Phosphate Rock:

This being an insoluble material causes practically no damage.

Mixed Goods:

These cause corrosive damage to a degree comparable with their most corrosive components.

Corrosion predictable?

THE question, to what extent is corrosion predictable? Mr. Clark answered that although corrosion of fertilizer materials is predictable, the prediction can not be sufficiently accurate. Factors in the environment can be selected as tending to increase or reduce the attack, but it is most difficult to assess the degree of attack and the interaction of these various factors.

A frequent question asked by engineers is, will mild steel be satisfactory, or is it necesary to use a more expensive material? To answer this question one must know the corrosion rate within a factor of 10 or better, which is much beyond the accuracy of prediction. It comes down to this, namely, to measure the rate of corrosion experimentally, and even this is none too easy.

It is rare, according to Mr. Clark, for service conditions to be sufficiently well-defined and uniform to permit their being exactly duplicated in a laboratory test, and in many cases the expense of doing this would be prohibitive. Most engineers make an initial choice of materials on the basis of simple test procedures in which a comfortable safety factor is allowed on the results. Comparative tests controlled accurately can be made on equipment in service only when it is possible to measure with adequate precision the effect of minor changes in the conditions or materials . . . And this is seldom the situation.

We see from these brief paragraphs how interesting and important the subject is to agricultural and equipment engineers and to plant superintendents. If any of my readers have comments on this subject of in-

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Future of the Pest Control Field —Its Trained Personnel

By Charles E. Palm

IN a critical analysis of the entomological industry . . . its opportunities, accomplishments and future . . . one becomes increasingly aware of the tremendous advance of the field. It is also apparent that an important problem, and one which should be of concern to the entire pesticide industry is where it will get its trained personnel in the years ahead. Are we attracting and training sufficient high calibre young men and women today to satisfy the demand ten to twenty years from now?

Perhaps it is futile to give too much thought to the matter at this time, since we don't know what the demand may be in another decade. Economic conditions may change; new super pesticides may reduce the necessity for extensive personnel. Conceivably we may alter radically our present concepts of methods for pest control. Whatever projection of ideas we may propose today, the fact remains that other competitive fields of science and business are working toward insuring themselves of adequate manpower. Many fields are trying to bring to the attention of high school guidance counselors the opportunities their fields offer. Contests are being sponsored to select outstanding talent at the national level, and good publicity is given to the opportunities in the fields of chemistry, nuclear physics, engineering and other professions.

No one needs to tell a high school student what the field of medicine offers—he knows in a general way, at least, if not in some detail. He is acquainted with atomic energy through his familiarity with the pictures and publicity about the atom and hydrogen bombs, and the peacetime uses of nuclear energy now in progress. He knows something of the fields of engineering, general business and so on. Many of these professions have made it their business to see that guidance counselors have the latest information concerning their fields, booklets describing job opportunities, films showing the work of the profession, public relations personnel to speak to young people and the like. The nation is awakening to the great problem of a shortage of teachers that its schools and colleges face with the growing tide of youth. The young people of today need every opportunity available to them in preparation for becoming useful citizens in the life ahead. Not only will they compete among themselves, they will compete as a nation with others in the free world for a fair share of the business, the service that can be rendered to humanity, the leadership that will maintain free enterprise as a cherished way of life.

The question, then, is what is the agricultural pesticide field, and in a broader sense, the basic sciences of entomology, plant pathology and horticulture, doing to acquaint students with the opportunities afforded by these professions? The unfortunate fact, speaking as an entomologist, is that too many people still think of an entomologist in terms of a person who catches bugs, rather than as a useful member of the team of scientists that constantly strives to do something of benefit for human welfare. It is not unlikely that a great many people fail to realize that an entomologist can develop a successful professional career and make a respectable living from his profession.

Maybe we have not given sufficient attention to telling, and retelling our story of service, and opportunity for service. Technology has advanced agricultural production to the point where only one in seventeen of our population is needed for production of food and fiber. This is an enviable record that is not exceeded elsewhere in the world. With scientists from other nations, our pest control specialists have entered the field of international cooperation to share their knowledge with areas less fortunate than ourselves. With the expanding needs for trained personnel in industry, government and college positions, what is the outlook for meeting future requirements?

I know that some in the profession may not agree with me, yet I submit that the fields of pest control have not fully presented their opportunities for creative work to the youth of the nation. Realizing that the 4-H Club, the Future Farmers, Vocational Agriculture and similar groups are giving attention to pest control, and some with financial support and publicity from sponsoring industry programs, we are still falling short of our opportunities in seeing that today's youth, and their parents, know the full story. We are in a highly competitive age for talent, and the competition is keen with new fields of endeavor, which outline profitable futures. If industry, government and the colleges are to compete favorably, they must obtain the necessary recruits for personnel in the future.

In recent years, some of the graduate schools of the country have found difficulty in locating suitably trained students for assistantships in fields associated with pest control. Many of them have taken students who wish to go ahead in graduate work, not because of undergraduate specialization, but as students trained in the broad field of biology, chemical and physical science, who wish to specialize during their graduate

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WASHINGTON *Report*

by
Donald G. Lerch
Cornwell, Inc., Washington, D. C.
(Agricultural Chemicals Washington Correspondent)

AGRICULTURE is bound to be front page news during most of this year, and some of the claims and statements made about it by politicians and others seeking to win elections are apt to be somewhat confusing to the businessman whose job is to sell agricultural chemicals. Agriculture has two kinds of surpluses, one is of commodities, the other statistics. There are literally tons of statistics available to anyone willing to search, and you can build an amazing array of stories from them. Our purpose here at the dawn of this election year is to pull out a few facts on the size and shape of the farm market which we hope will be interesting and helpful.

The underlying fact is that the farm family like any other family, will do everything it can to maintain the highest possible income despite falling prices, acreage restrictions, and other government controls. The present glut of hogs is an example of this. However, since the major market for the manufacturer of agricultural chemicals is cropland, we'll run down the outlook for some of the most important crops.

Cotton: At this writing, an almost record percentage of growers voted in favor of controls, although 20 percent fewer growers voted then a year ago. This means about 4 percent fewer acres can be planted legally this year. The cut being from 18.1 million acres to 17.4 million acres. Under the law, cotton is supposed to move from the "old parity formula to the new parity formula" which is lower. However, the difference is less than 5 percent in the price. Whatever the final announcement on parity, it is likely that in practical terms the loan rate on cotton will be about 4 cents a pound less than it was in 155.

Vegetables: Generally favorable outlook for commercial vegetable production for the fresh market this year — assuming the growers don't rush in and over plant. If the output this year is the same as last, prices may be up a little. The U.S. Department of Agriculture recommended increased acreage for three vegetables — snapbeans, cucumbers, and green peas.

Prospects for vegetables for commercial processing are also bright, with government sources optimistic about prices this year due to a better balance between demand and carry-over stocks in the hands of processors.

Potatoes: Potato production may be a little under last year when the crop was increased in many important producing areas by two factors—increased acreage and increased yields.

Overall, it's heartening to note that the per capita consumption of commercially produced fresh and processed vegetables is considerably higher than 15 to 20 years ago.

Fruit: No major changes in acreage are expected. Many crops last year were under the year previous, so it can be expected many growers will be making special efforts to boost production this year. For instance, last year's apple crop was 4 percent under the year previous, pears down 1 percent, citrus down 2 to 12 percent depending on the variety, and peaches 17 percent under a year ago.

The financial situation of farmers reflects a paradox. Realized net farm income last year dropped 10 percent below a year earlier. Yet the total value of farm assets and of farmers' equities in these assets increased. The reason is that the value of farm land is still going up. Rising land prices appear to be bolstered by the demand of farmers themselves to increase the size of their operations as they drive hard to increase their efficiency. Also, there is plenty of mortgage money available and enough people have confidence in the long-term outlook to invest money in land.

However, the liquid assets of farmers were reduced a little and debt increased a great deal.

Special note for the cotton belt—the most favorable reports on the change in the financial situation from 1954 to 1955 come from the southern states. Excellent crop yields apparently improved the financial circumstances of farmers and enabled many of them to reduce debts carried over from earlier years.

In contrast, crop yields in the western part of the corn belt were reduced drastically by drought, and the situation has been worsened by the low price of hogs.

Dairy farmers in general are reported to be in as good, or perhaps a little better, financial condition than a year earlier. Cattle feeders are hit by drought and falling prices.

During 1956, farm income is expected to run a little under last year —possibly 5 percent. If such a drop develops, it will still be only half as much as the drop which occurred last year. What's more, plenty of credit should be available to farmers all during the year at interest rates about the same as a year ago. Some farmers, however, may be required to give more security for loans.

This is the way economists and students of agriculture forecast conditions for the remainder of this

year. Because this is an election year, Congress can be expected to be generous with financial aid to agriculture. Also, the Republican Administration undoubtedly will present programs to Congress, only parts of which will be enacted. Nevertheless, you'll see a greatly expanded government program extending more aid to farmers. There will be a land bank, more money for research, more subsidies to liquidate surpluses, more money for the low-income farmers, and greater authority for farmers to fix production and prices for the commodities they sell. Details are being hammered out by the Administration and Congress right now.

* * *

Methoxychlor and chloretetracycline are candidates for honor as "historic firsts." The Food and Drug Administration's tolerances of 3/ppm of methoxychlor in the fat of meat—the raw agricultural commodity—marks the first time the Agency has placed a formal tolerance on pesticidal chemicals in livestock. This represents the culmination of many months of discussion and negotiation and apparently establishes a precedent whereby other chemicals may receive tolerances, providing sufficient data on residue studies are available.

Another aspect of the livestock problem is apparent in the Food and Drug Administration's establishment of a tolerance for 100/ppm methoxychlor on certain forage crops. The Agency emphasizes that studies show that methoxychlor at this residue level will not carry over into milk and will not leave an excessive residue in meat.

By these two actions the Food and Drug Administration recognizes that scientific study has proceeded far enough for the establishment of tolerances throughout the complete cycle. That is to say, tolerances are now, in effect, concerning not only the production of forage crops but on the effect of residues on forage crops through the slaughter of livestock into salable cuts of meat.

Since the market for pesticides for forage crops, as reflected in resulting meat and milk, is the pioneering stage compared to the use of pesticides on fruits and vegetables, it has been possible to complete this cycle without resorting to lengthy and expensive hearings, such as were held on fresh fruits and vegetables. For this, all concerned are to be congratulated.

Chloretetracycline—the first antibiotic to be permitted on food—also establishes a precedent. The tolerance of 7/ppm in uncooked poultry is not an average figure. Rather this tolerance cannot be exceeded in any part of the bird. The Food and Drug also makes the point that the antibiotic is not likely to be used for covering-up or masking an inferior product.

The new process—trade name "Acronize"—keeps dressed poultry fresh by stopping or slowing down the action of spoiling bacteria. Tests show that when used with refrigeration, it keeps poultry fresh more than twice as long as with refrigeration alone. Dressed poultry is dipped into solution at the processing plant.

These actions are indicative of the work going on at the Agency where new tolerances are being announced from day to day on the use of agricultural chemicals on fruit and vegetable crops, as the practical working date for the Miller Amendment comes closer. For many chemicals this date is January 22.

* * *

Looking for a new market for agricultural chemicals? Contact Professor Richard Jorgensen at Penn State University, College Park, Pennsylvania. He is working on a grant from telephone and utility companies to find a way to keep woodpeckers from pecking holes in poles.

Woodpeckers have long been the delight of birdwatchers, but they drive telephone and utility men into near fits. One executive says that in ten years the loss from woodpeckers has increased almost fourfold. Some of the early research shows there is an outside chance that poles may be involved in the woodpecker's love life. According to some thinking, the male bird will tap anything handy during the courting season in order to attract the female. Dr. Jorgensen, however, will have to wait until spring to explore this angle because that is when woodpeckers' love matches take place.

Dr. Jorgensen is hard pressed to find an answer, but he is far from discouraged. He hopes that some new chemical compound will be found that will smell bad or taste bad, or change the mating habits of the male woodpecker so he finds something else upon which to drum up a courtship.

Interested companies take note.

* * *

The Natl. Agr. Chemicals Association is to be congratulated for continuing progress in the field of industry statistics—a field considered by many to be in the early stages of development. Latest figures released through the Department of Agriculture on the basis of National Agricultural Chemicals Association's information, obtained by Lea Hitchner, executive secretary, show that while adequate supplies are available, the industry goes into this selling season with smaller stock piles. Apparently many manufacturers are determined to keep stock piles in closer check, much to the pleasure and satisfaction of company bankers.

The degree of success can be measured this way—that as of September manufacturers' carry over stocks of major pesticidal chemicals were 9 percent smaller than on the same date in 1954. And this is enough to put a smile on any manufacturer's face — carry over stocks were nearly 30 percent less than in 1953.

•

Canners Meet In Atlantic City

Ezra Taft Benson, Secretary of Agriculture, is scheduled to address the National Canners Association convention, January 19-21 in Atlantic City, N. J. Of inertest to the agricultural chemicals industry is a raw products conference on agricultural research, January 20th. Participating in this discussion will be C. H. Mahoney, NCA; F. B. Cullinan, USDA; E. G. McKibben, USDA, and W. W. Pate, USDA.

LISTENING *Post*

Weevil Hibernation Counts High; Heavy Hopper Infestation in '56

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Economic Insect Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the U. S.

By Kelvin Dorward

BOLL weevil hibernation surveys conducted by cooperating State and Federal agencies in Madison Parish, Louisiana and Florence County, South Carolina record highest counts since this type of survey was begun in the respective States. In Louisiana the survey, which is conducted by collecting woods trash adjacent to cotton fields, was started November 7 and completed November 21. An average of 13,443 live weevils per acre was found in the 200 (two square yards) samples collected in Madison Parish. This was 5.7 times the average number recorded for the Parish during the past 19 years. It is 2.6 times the number found during the fall of 1953 which was the previous high year for the period, and five times the number found during the fall of 1954. Although weather and other factors will determine the number of weevils coming out of hibernation next spring, the following fall hibernation figures for the past ten years should prove interesting for study: 1946-47, 2,698 weevils per acre; 1947-48, 1,178; 1948-49, 2,146; 1949-50, 3,231; 1950-51, 4,586; 1951-52, 1,367; 1952-53, 1,295; 1953-54, 5,239; 1954-55, 2,686 and 1955-56, 13,443.

In eight additional parishes, St. Landry, Avoyelles, Rapides, Natchitoches, Red River, Bossier, Ouachita and Tensas, 130 samples were collected, with an average of 3,742 boll weevils per acre being found. Of these eight parishes, samples were collected in five of them in the fall of 1954. The 1955 counts are 1.8 times those of last fall. The average for all 330 samples collected in Louisiana this fall is 9,621 live weevils per acre.

During the second week of November, 200 square yards of surface woods trash were examined from 20 farms in Florence County, South Carolina. Live boll weevils found averaged 11,398 per acre, which was 4.9 times the average for the fall of 1954 and 2.3 times the average for the 13 year period during which records have been maintained. Average counts for the past nine years in Florence County are as follows: 1947-48, 3,974 boll weevils per acre; 1948-49, 3,969; 1949-50, 10,744; 1950-51, 4,816; 1951-52, 1,573; 1952-53, 6,259; 1953-54, 3,533; 1954-55, 2,299 and 1955, 11,398. Three hundred square yards of surface trash were collected in the counties of: Darlington, Sumter, Clarendon, Laurens, Horry and Orangeburg. The average number of weevils per acre in these counties was 8,260 or 5.5 times the number found in the fall of 1955.

The cooperative agencies collected and processed 200 square yards of surface woods trash in southern Virginia. Samples were collected from five farms in each of four counties. In three of these counties, Southampton, Brunswick and Mecklenburg, the 1955 average was slightly below that of 1954, being 1,484 and 1,791, respectively. Figures are not available for 1954 in Nansemond County, but the average number of hibernating weevils per acre for this county for the 1955 fall survey was 1,452.

Fall hibernating boll weevil surveys are also being conducted in other cotton growing States, and next spring a survey will again be conducted to determine the percentage of survival.

Heavy Hopper Infestation for '56

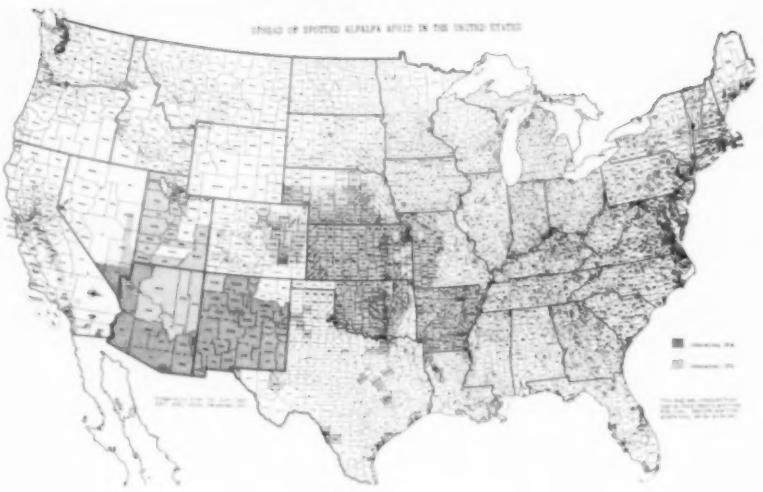
THE cooperative grasshopper adult and egg survey conducted during the late summer and fall has been completed for 1955. The 1956 rangeland grasshopper problem is expected to be more widespread and severe in the southwest than at any time in recent years. It is expected that approximately 20,375,000 acres of rangeland in 16 Western States will carry grasshopper infestations sufficient to require control. This is a considerable increase over the 6,000,000 acres which were in the preliminary estimate for the 1955 control season. The estimated infestation of rangeland acreage for 1956 by States is as follows: Arizona, 140,000; California, 1,309,000; Colorado, 925,000; Idaho, 112,000; Kansas, 7,198,000; Missouri, 11,000; Montana, 1,354,000; Nebraska, 1,000,000; Nevada, 20,000; New Mexico, 2,801,000; Oklahoma, 1,944,000; Oregon, 422,000; Texas, 8,747,000; Utah, 50,000; Washington, 40,000 and Wyoming, 300,000. Final determination of the acreage of range to be treated will be made by nymphal survey in the spring. Cropland infestations are expected to be generally more threatening than during the 1955 control season.

The Mormon cricket infestations

which are confined to six States, Idaho, Utah, Nevada, Colorado, Wyoming and Montana, approximate 180,000 acres, of which 100,000 are expected to require treatment. This figure varies little from the 95,000 acres which were treated during the 1955 control season.

Spotted Alfalfa Aphid Distribution

The accompanying map shows rather graphically the spread of the spotted alfalfa aphid which was first reported from New Mexico in February 1954. This map, which represents information obtainable through December 9, shows rather marked spread in Missouri, since the report appeared in the December issue of this magazine.



Systemic Nematocides Tested on Alfalfa

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

G. B. Bergeson, of the University of California, writes that highly significant control of *Ditylenchus dipsaci* in greenhouse tests was obtained with the use of OS1836 (diethyl 1-chlorovinyl phosphate)on alfalfa, and with Systox and OS1836 on daffodils.

OS1836 for Control of Ditylenchus dipsaci on Alfalfa: Ditylenchus dipsaci infestation on alfalafa is becoming an increasingly serious problem in certain cool humid areas of California. Control at the present time is a matter of either crop rotation, or the planting of two reportedly resistant varieties, Nemastan and Lahonton. Neither method is of immediate value to a grower whose young alfalfa field is showing the reduced growth and premature die-out associated with heavy infestations of *D. dipsaci;* on the other hand, a systemic nematocidal material that could be applied to the growing alfalfa would be ideal in such cases. The discovery of systemic insecticides, with the property of ready translocation to all the foliar portion of the plant, favors the development of this type of control. One such systemic, OS1836, was selected for small pot tests conducted under greenhouse conditions.

The first tests were conducted to determine the comparative effectiveness of a drench application versus a spray application. This was done by spraying a series of infected alfalfa seedlings in 4-inch clay pots with concentrations of 0.2%, 0.1%, and 0.5% of OS1836 formulated as a 20% concentrate in acetone, containing a 5% Triton X-100 emulsifier. A duplicate set of potted alfalfa seedlings received the same quantity of chemical applied as a drench around the bases of the seedlings. Each treatment was replicated five times, and one set of five pots was left untreated to serve as the control. One and 2 weeks after treatment, bud samples were taken and chopped in a food blender, and the nematodes recovered by screening. Results of these examinations appear in Table 1. On the basis of the data in Table 1 there appeared to be no distinct superiority of one application method over the other. All treatments gave highly significant reductions in the total number of nematodes present 2 weeks after treatment. The 0.2% concentration was somewhat phytotoxic, and consequently did not give growth increases equal to that of the next lower concentration.

Mortality determinations of the nematodes remaining in the tissues after 2 weeks were very difficult and often uncertain. To check these determinations, the material from which the counts were made was used to inoculate pots that were subsequently planted to alfalfa. Several weeks later, an examination of these inoculated alfalfa plants showed them all to be infested to varying degrees. From this one might conclude either that some of the moribund nematodes recovered successfully, or that the chemical was not killing the egg stage of the nematode. Whatever the reason, it was evident one application was not sufficient for complete control.

A second series of tests was conducted in much the same manner to determine the benefits of repeated sprayings. Infested alfalfa seedlings were divided into 3 lots of 4 pots each. A 0.1% concentration of OS-1836 formulated as before was used

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Table 1. Comparison between spray and drench methods of applying OS1836 for control of **Ditylenchus dipsaci** in alfalfa; amount applied 40 cc each treatment.

Method of application	Concentration (%)	1 week after treatment: Nematodes per gram of bud	1 week after treatment: Condition of nematodes	2 weeks after treatment: Nematodes per gram of bud	2 weeks after treatment: Condition of nematodes
Spray	0.2	4,464	Inactive	480	Apparently dead
	0.1%	2,125	A few slightly active	720	A few slightly active
	0.5	4,800	Most nematodes slightly active	640	33% active
Drench	0.2	3,036	A few slightly active	225	A few slightly active
	0.1	1,812	Several slightly active	315	Several slightly active
	0.05	3,779	Most nematodes slightly active	687	Several active
Control		8,571	Almost all actively moving	9,000	Almost all actively moving

throughout. This concentration was chosen because it represents the highest concentration that did not show phytotoxicity to the alfalfa. The first lot of pots received one spraying, the second lot received two sprayings at weekly intervals, and the third lot received three sprayings at weekly intervals. A fourth lot of pots was left untreated and served as a control. One month was allowed to elapse before examinations were made in order to allow eggs to hatch and to aid in distinguishing between dead and living nematodes. At the end of this period, the foliar portion of the alfalfa plant was cut and weighed. After weighing, the stems and leaves were chopped in a food blender and counts of the nematodes present were made. These data appear in Table 2.

Results in Table 2 indicate that at least three spray applications are necessary for eradication and that increased yields were obtained with a reduction in the nematode population.

Comparison of Different Systemic Phosphates for Control of Ditylenchus dipsaci on Daffodils and Alfalfa: In experiments reported elsewhere, the maximum observation time after treatment for determining the degree of control had been 5 and 7 days. One of the objectives of this experiment was to extend this period of observation up to 28 days. Another objective was to include the two most effective systemics reported for direct comparison in the same experiment. OMPA (octamethyl pyrophosphoramide) was included, because trials with it had apparently not been reported previously.

Ninety infected daffodil plants in 6-inch clay pots were selected for this experiment. These were divided into 10 lots of pots each. Each chemical was formulated as a 25% concentrate in acetone containing a 5% Triton X-100 emulsifier, and then prepared as an aqueous emulsion in concentrations of 1.0%, 0.5% and 0.1% of the actual ingredient. The treatments were replicated nine times and consisted of a 100 milliliter drench per pot of the above concentrations at weekly intervals for a total of 3 weeks. At the end of this period, each of the nine pots in each treatment had received a total of 3 ml., 1.5 ml., and 1 ml. of chemical, depending on which series they were in. One lot of nine pots served as the control and received only water, acetone, and emulsifier. Treatments were conducted in a greenhouse at a temperature of approximately 75°F.

Table 2. Comparison between number of spray applications of OS1836 for control of **Ditylenchus dipsaci.**

Number of applications	Nematodes on foliage	Total green weight (gm)
3	0	25.0
2	8.2	24.2
1	13.0	23.1
Control	41.0	19.1

Results were determined by removing five of the nine plants at 1 week, and the remaining four plants at 4 weeks, after the final treatment. Nematode counts were made by weighing bulbs and leaves separately and then placing them in a food blender for 15 seconds. The nematodes were separated from the plant debris by screening and placed in 100 cc of water, from which two 1 cc aliquots were taken and examined in a counting slide. If less than 10 nematodes per 1 cc were found, then two 5 cc aliquots were examined in a counting dish. Results are summarized in Table 3.

(*Continued on Page 102*)

Table 3. Comparison of control of **Ditylenchus dipsaci** in daffodils 1 and 4 weeks after treatment.

Chemical and dosage (%)	Bulb: Nematodes per gram: No. living at 1 Week[a]	Bulb: Nematodes per gram: No. living at 4 Weeks[b]	Bulb: Percent reduction at 1 Week	Bulb: Percent reduction at 4 Weeks	Leaf: Nematodes per gram: No. living at 1 Week	Leaf: Nematodes per gram: No. living at 4 Weeks	Leaf: Percent reduction at 1 Week	Leaf: Percent reduction at 4 Weeks	Percent increase in leaf weight at Week 1	Percent increase in leaf weight at 4 Weeks
Control	61.3	139.0	—	—	310.5	6708	—	—	—	—
Systox										
1.0	29.1	0	52.5	100	35	0	88.7	100	13.6	248
0.5	.3	0	99.6	100	.3	0	99.9	100	10.6	283
0.1	56.2	2	8.4	98.6	92.5	0	70.3	100	3	506
OS1836										
1.0	0	0	100	100	0	0	100		45.4	145
0.5	0	0	100	100	0	0	100	100	40	109
0.1	0	0	100	100	0	13	100	99.9	186	322
OMPA										
1.0	.2	27.7	99.7	80.1	38.2	548	87.7	91.8	43.9	351
0.5	14.6	240	76.2	0	55.6	119.5	82.1	98.2	78.7	325
0.1	11.3	38.0	81.7	77	53.8	1588	52.7	76.4	113	419

[a]Average of 5 replications.
[b]Average of 4 replications.

Technical SECTION

Polyvinylpyrrolidone-Iodine Shows Promise As Agricultural Chem.

STUDY and investigation of the application of polyvinylpyrrolidone-Iodine in the field of agriculture have shown that this polymeric compound may find use as an insecticide, fungicide, nematocide and soil pesticide. PVP has been in use as a pharmaceutical for many years. The Iodine complex, a new development, has been found to have particularly good insecticidal and fungicidal properties. Compounds such as potassium cyanate, phenyl mercuric acetate, etc., while giving control of crabgrass with very little permanent injury to the basic or desirable grasses, have a tendency to discolor good grasses. It is reported that this discoloration, phytotoxicity, is overcome by employing a mixture of the herbicide and PVP. The presence of PVP in the mixture acts as a detoxifying agent, and eliminates the discoloring effect of the herbicide on desirable grasses, without impairing, reducing, or delaying the herbicidal activity against crabgrass. Aqueous solutions of PVP, and various copolymers thereof, may be sprayed on the foliage of certain ornamentals, such as evergreens, azaleas, rhododendrons, and mountain laurel, to prevent wilting during transplanting, and windburn or excessive transpiration during winter months.

Interest in PVP was further heightened with the discovery that it combines with iodine to form a compound in which iodine is largely detoxified without losing its therapeutic value. PVP-iodine compound is effective as an insecticide, fungicide, nematocide and soil pesticide. It is not toxic, within certain limits of concentration, to plants and warm blooded animals, including man. The PVP-iodine compound, which is a very stable composition and soluble in water, is readily used in the preparation of pesticidal compositions which have no toxic effect as such, or the residues thereof, on plants. Aqueous solutions of the PVP-iodine compound may be used as such in the form of sprays, or the compound, which is a yellowish-red powder, may be used in dust compositions and applied directly for insect and fungi controls. Aqueous solutions or dust compositions containing from 0.1 to 5% by weight of the PVP-iodine compound control leaf nematodes, *Aphelenchoides ritzema-bosi*, root knot nematodes, *Meloidogyne* species; leaf spot, *Alternaria species, Septoria chrysanthemi* and *Cylindrosporium chrysanthemi*.

According to the manufacturer, aqueous solutions containing from 100 to 1000 parts per million of PVP-iodine are very efficient in the control and eradication of soil pests such as garden centipedes, i.e. symphilids, *Scutigerella immaculata*, wire worms, white-fringed beetle, beetle grubs and various other soil pests and nematodes.

Advantages of the PVP-iodine compound as a pesticide are:

1) Complete solubility in water.
2) Low vapor pressure, allowing soil fumigation to proceed over a longer period, and provide for the retention of toxic concentrations of the composition in soil for extended periods.
3) In aqueous concentrations, even as high as 20 percent by weight, the PVP-iodine compound (containing as much as 25 percent available iodine) is not toxic to warm blooded animals, human beings, and plants in general.

The application of aqueous solutions of the PVP-iodine compound does not require costly equipment, as the aqueous solution is merely sprayed on the soil in the concentration of 10-20 percent by weight and hosed in with water or rain and allowed to soak.

PVP-iodine compound has been investigated by several professional entomologists and plant pathologists with the following results:

Nematodes of the species *Panagrellus redivivus* were killed between 2-4 hours with an aqueous solution of PVP-iodine compound, containing 10 percent available iodine, in a concentration of 1000 ppm. Tests with aqueous chlorpicrin of the same concentration as a standard, gave a complete kill in 2-4 hours.

Experimental results have shown that a 5 percent aqueous solution of the PVP-iodine, containing 12 percent available iodine, when applied by means of a camel hair brush to the dorsal thoracic region of 12 meal worm larvae, *Tenebrio molitor*, killed the larvae after three hours contact. Experimental results also showed that when a 0.5 percent aqueous solution of the PVP-iodine, containing 15 percent available iodine, was applied to soil infected with symphilids, *Scutigerella immaculata*, a complete kill was obtained within 4 hours. Aqueous solutions of the compound were also effective when used as sprays on chrysanthemums in the control and eradication of the leaf nematode, *Aphelenchoides ritzema-bosi*.

When applied in the form of spray, the PVP-iodine gives a substantial kill of red spider mites, *Tetranychus bimaculatus*. The same spray applied to aphids, *Macrosiphum sanborni*, gave a kill of 90 percent.

Initial experiments have indicated that all diseases primarily attacking underground parts, and which are due to soil borne organ-

isms such as root rot caused by fungi (*Pythium, Rhizoctonia*), wilt caused by fungi (*Fusarium, Verticillium*), root knot caused by nematodes, *Meloidogyne* species, may be controlled by spraying the soil with aqueous solutions of PVP-iodine compound in which available iodine ranges from 5 to 15 percent.

PVP-iodine is now being produced by General Aniline & Film Corp., New York, on a pilot plant scale. It is available in limited quantities for ornamental plants.★★

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New Pyrethrum Synergist

Morton Beroza, USDA, announced recently that in his studies on the structure of sesamolin he may have the ground work for development of a commercial process of extracting sesamolin from oil of sesame seed . . . a synthetic sesamolin or sesamolin related material.

Sesamolin has long been recognized as a powerful pyrethrum synergist. The compound, according to Beroza, is 2-(3,4-methylenedioxyphenoxy) - 6 - (3,4 - methylenedioxyphenyl)-cis - 3,7-dioxabicyclo(3.3.0)-octane. When mixed in a 1:1 (by weight) mixture with pyrethrum, it increases the latter's fly-killing power by 31 times; most commercial synergists afford up to a 12-time boost.

It is pointed out that the studies are still on an experimental basis, but research thus far is very encouraging in the indication that a commercial process for manufacture of the synergist may not be too far off.

•

Synergists Up Allethrin Effects

Toxicity of allethrin to house flies was raised three to four times above that expected when certain N-substituted piperonylamides were applied jointly with allethrin. Most effective synergists in oil space sprays were N-o-tolyl, N,N-diethyl, N-propyl, and N-(o-bromophenyl) piperonylamides.

Similar studies with another group of N-substituted compounds resulted in double the expected toxicity of allethrin alone. The effect was obtained with N-amyl-2,4-dinitroaniline, N-amyl-o- chlorobenzamide, and N-*sec*-amyl-o chlorobenzamide.

Insect Control By Disease

Experimental success with a newly discovered nematode-borne disease, which kills a great many different kinds of insects, is announced by the U.S. Department of Agriculture. If further research, now underway, upholds preliminary findings, the disease may prove to have broad-scale application and value to American agriculture in controlling insect pests, the Department says.

Dr. S. R. Dutky, insect pathologist of USDA's Agricultural Research Service, reports that the new disease has so far proved deadly to the codling moth, the corn earworm, the boll weevil and pink bollworm, the vegetable weevil, a cabbage worm, and the white fringed beetle.

The disease, Dr. Dutky says, is actually a nematode-bacteria combination. Nematodes, in piercing the intestine of attacked insect larvae or adults, release disease bacteria that rapidly multiply. The bacteria quickly kill the insect—usually in less than 24 hours. They also serve as a source of food for the nematodes, permitting them also to multiply rapidly.

Limited field tests, carried on in cooperation with Dr. Hough in Virginia apple orchards, indicate that 67 to 70 percent control of codling moths may be possible with the nematode-borne disease. The method provided nearly the same degree of control of the corn earworm in tests at Beltsville.

The nematode in its infective stage can survive long periods without food. This permits survival when hosts are not available. So far, tests have shown that the nematodes can be forced through a high pressure spray nozzle without too great a degree of mortality. They are also quite resistant to most insecticides in common use. These two facts make it likely that both the nematodes and insecticides could be used simultaneously for insect control.

Dr. Dutky points out that despite the promise of this parasitic disease, much research must be done before it can become of real value to farmers. Its potential worth should be increased as the host range of insects on which it is effective and the time and mode of treatment are more fully determined.

•

DAP By Dorr-Oliver Process

Missouri Farmers Association's new fertilizer plant at Joplin, Mo., a $5 million dollar installation of 200 ton/day capacity, uses a new Dorr-Oliver process for making diammonium phosphate starting with phosphoric acid. The process is different from TVA's system which also uses wet process phosphoric acid as raw material.

The TVA process consists of ammoniating unconcentrated wet process acid containing recycled mother liquor, filtering off the resulting precipitate, and treating the resulting filtrate with additional ammonia in a vacuum crystallizer. The filter cake from the initial precipitation step, consisting largely of iron and aluminum phosphates, is mixed with the diammonium phosphate crystals from the crystallizer product centrifuge prior to drying. (See AC, April, p. 63.)

Both TVA's crystallization process and Dorr's technique have been developed to use wet-process acid containing aluminum and iron impurities which tend to form gummy, hard-to-handle precipitates.

At Joplin, the Dorr-Oliver system makes DAP by a modification of the standard mono process. Wet-process acid (32% P_2O_5) is added to the first of three agitated tanks in series. Ammonia goes in at two stages. From the third tank comes a slurry—20% water—containing a 20-80 mixture of mono- and diammonium phosphate. All impurities are also precipitated. Ammonia loss is kept down by using a liquor concentration with a high ammonia absorption capacity and by an efficient scrubbing system for recovery and recirculation of ammonia. Granulation of the DAP, addition of other solid components and drying gives a complete fertilizer mixture.

Dorr officials believe that this process offers economies over the TVA method, since the filtration of impurities and vacuum crystallization steps are elminated. *Chemical Engineering*, August, 1955.

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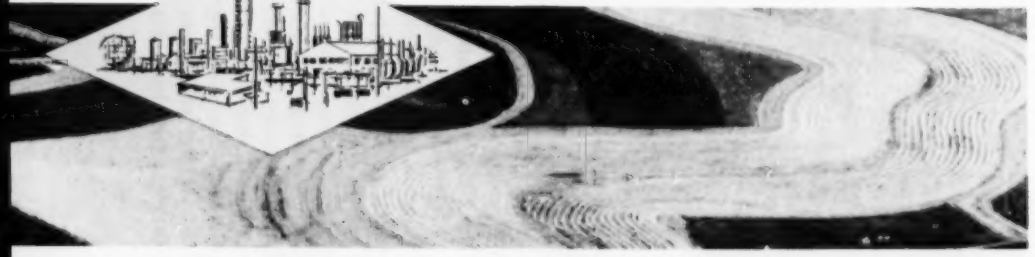

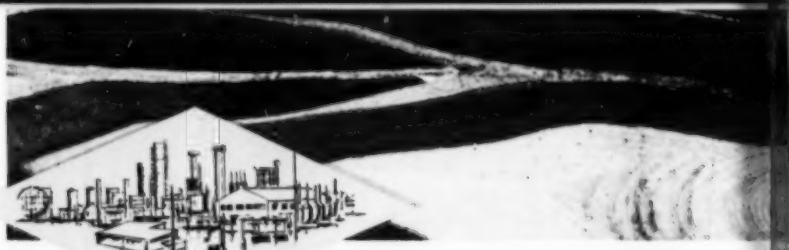

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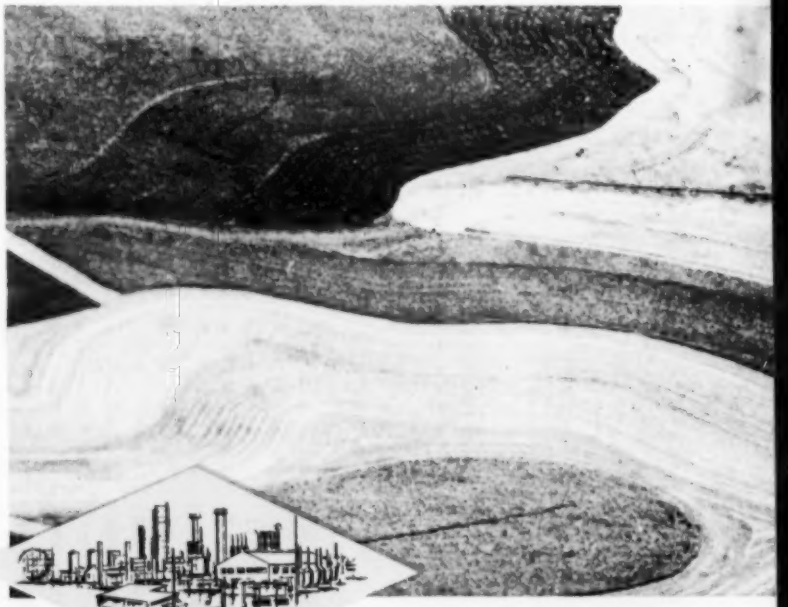

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MISSISSIPPI RIVER CHEMICAL COMPANY
A Division of [illegible]

Ryania for Apple Growers

USDA scientists observing the 1955 apple crop in an experimental orchard near Kearneysville, W. Va., report that the harvest this year again testifies to the value of ryania as a selective insecticide for apple growers in the East. These studies were carried out in cooperation with the West Virginia Agric. Exp. Station.

Results since 1952 with apple crops at the West Virginia orchard, and on cooperating commercial tracts nearby, have shown that ryania has several important advantages:

(1) It has selective action; (2) It controls the codling moth, and might provide an excellent reserve defense if DDT-resistant strains of moths develop. (3) Ryania does not injure plant tissues, is comparatively safe for man and warm-blooded animals, and is one of the few pesticides exempt from residue tolerance on growing crops.

Ryania's chief disadvantage at present is that it costs more than most other common insecticides.

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Maneb For Celery Blight

Better control of early blight of celery was obtained using maneb than with any other dithiocarbamate fungicide available, according to data from a three-year period of treatment and testing.

Test plots were sprayed at Celeryville, Ohio, in 1952, when untreated checks yielded only about half as much as most of the treated areas. Again in 1954, the disease became severe but as a result of several fungicide applications, the yield was more than doubled.

Maneb, in either the wettable powder or tank-mix formulation, gave better control of Cercospora blight of celery than did zineb or ziram, and all of these organic fungicides gave better results than did the fixed copper (tribasic). The fungicides formulated as wettable powders gave slightly better average disease control on the foliage than as tank-mix formulations; however this was not translated into higher yield.

Recommendations are to use the powder applied at three pounds per acre at six-day intervals, beginning shortly after the plants are set in the field and continuing until about 10 days before harvest. "Maneb Gives Best Control of Early Blight on Celery, J. D. Wilson, *Ohio Farm and Home Research*, Sept.-Oct., 1955.

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Hibiscus Disease Studied.

Strap-leaf of hibiscus, a malformation of the leaves and blossoms of this plant when grown on the acid soils of Florida, has been shown to be caused by a deficiency of molybdenum in the soil, according to a report at the 68th annual meeting of the Florida State Horticultural Society, November 1st, Clearwater, Fla.

Drs. P. J. Westgate of the Central Florida Experiment Station, Sanford, Fla., and H. N. Miller, of the Agricultural Experiment Station, Gainesville, Fla., stated that the plant disease can be corrected by adding five grams (about one teaspoon) of molybdic acid or sodium molybdate in one gallon of water applied as a foliar spray or soil drench. Duration of the effect of the molybdenum is increased by adding lime to the soil along with the molybdenum, their experiments showed.

The hibiscus disease which the research men identified as another molybdenum deficiency disorder has been under observation and experimentation in Florida since 1951. Its name—"strap-leaf" — was suggested by the characteristic narrow and strap-like appearance of affected leaves which are dark green, stunted and constricted, with prominent distorted, parallel veins. The flowers too are frequently deformed, sometimes having fewer than the normal number of five petals, or even a mere tubular corolla without petals.

Drs. Westgate and Miller found that affected plants invariably grew in acid sands with a pH of 5 or lower. Normal hibiscus plants, on the other hand, are found in more alkaline soils—those with a pH of 6 or higher. When hydrated lime was added to the diseased plants along with the molybdenum treatment, the Florida workers reported, the period during which new growth was normal in appearance was lengthened.

Fertilizer Loss in Fall

A study of soils and fertilizers by area showed that leaching losses are negligible in the plains states and parts of Minnesota and Iowa; however progressing eastward, leaching from most soils is likely to increase, and fall-applied nitrogen becomes questionable. In the South, where high percolation and temperatures predominate, fall application is not recommended. These are the conclusions of a recent study on the factors that influence loss of fall-applied fertilizers, with particular emphasis on the geographic patterns. The authors indicate that losses from water erosion are less during the over-winter period than during late spring and summer when high intensity rains are more frequent. In northern areas, erosion losses may be high when rainfall and thawing of snow occur at the same time on partially unfrozen soil.

No indication was found that fall nitrogen applications favor gaseous loss. For meeting major crop needs, fall application of phosphorus was found to be as desirable as a spring application. Factors that Influence Loss of Fall Applied Fertilizers and Their Probable Importance in Different Sections of the United States, L. B. Nelson and R. E. Uhland, *Soil Science Society of America Proceedings*, Vol. 19, No. 4, Oct. 1955.

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Dutch Elm Attack in Ill.

Control of Dutch elm disease was discussed at a recent conference in Chicago under the sponsorship of the Illinois State Chamber of Commerce. The seriousness of the situation in that state is emphasized by reports that during the past year this devastating disease has spread into 18 additional counties and that it is now known to exist in 73 of the 102 Illinois counties. During the summer, nearly 50 confirmed cases were discovered in the 40,000-acre Cook County Forest Preserves surrounding Chicago. Cases, were reported, too, in some 35 newly affected communities in the Chicago suburban area as far north as close to the Wisconsin state line.

Among speakers were Dr. Curtis May of the USDA's research service, Dr. J. C. Carter and Dr. Richard Campana of the Illinois National History Survey, Urbana, Ill., Dr. Donald S. Welch, of Cornell University, Ithaca, N. Y., and Dr. Russell B. Whitten, Columbus, Ohio.

LITERATURE AVAILABLE

The following list reviews a series of bulletins on fertilizer, insecticide and fungicide recommendations, controls, etc. For the most part, these bulletins and reports are prepared by the various state agricultural experiment stations, and copies may be obtained by writing directly to the respective stations.

CONTROL OF DDT — RESISTANT POTATO FLEA BEETLES, by James B. Kring. A 22-page pamphlet reporting studies with DDT in three areas in Connecticut for protection of potato foliage from damage by the potato flea beetle. DDT was less effective than several insecticides used alone or in combinations. Circular 193, April 1955, The Connecticut Agricultural Experiment Station, New Haven, Conn.

THE WESTERN PINE BEETLE. Describes this forest insect, lists host trees, and discusses evidences of infestation, life history and habits of the insect, and natural and applied control measures. 1955. 4 p. U. S. Gov't. Printing Office, Washington 5, D. C.

WHEAT FERTILIZATION STUDIES IN WESTERN OKLAHOMA, PROGRESS REPORT, 1953-54. Results of tests indicated that maximum response from nitrogen fertilizer can be expected only after phosphorus needs are fulfilled. Authors recommend that in dry areas nitrogen application be delayed until late winter or early spring. Mimeographed Circular M-270, Agricultural Experiment Station, Oklahoma A. & M. College, Stillwater, and Soil and Water Conservation Research Branch Agricultural Research Service, U.S.D.A.

SOME EFFECTS OF CERTAIN GROWTH-REGULATING SUBSTANCES UPON PREMATURE SEEDING IN CABBAGE, by E. L. Moore. Reports tests made during 1949-52 on Golden Acre and Round Dutch cabbage at State College, Miss. Technical Bulletin No. 40, March 1955, Mississippi State College Agricultural Experiment Station, State College, Miss.

PRUNING, CLUSTER THINNING, AND POTASH FERTILIZER EXPERIMENTS WITH CONCORD AND DELAWARE GRAPES GROWING ON DOG RIDGE ROOTSTOCKS, by J. P. Overcash. Tests were conducted at State College, Miss. on grapes growing from Kaufman very fine sandy loam soil. Technical Bulletin 41, April 1955, Mississippi State College Agricultural Experiment Station, State College, Miss.

CHEMICAL STATISTICS HANDBOOK, FOURTH EDITION, 1955. Contains 410 pages of information and statistics relating to the chemical and allied products industries. Was formerly called "Chemical Facts & Figures." Published by the Manufacturing Chemists' Association, Inc., Washington, D. C.

CONTROL OF SPITTLEBUGS ON STRAWBERRIES. A four page pamphlet containing description and life history of spittlebug and control recommendations. Extension Circular 253, Extension Service, State College of Washington, Pullman, Wash.

CHEMICAL INVESTIGATIONS OF THE TOBACCO PLANT, by James K. Palmer. A technique is presented for the rapid and accurate determination of maleic and citric acids and of the total nonvolatile organic acidity in water or ether extracts of dried tobacco leaf tissue. Preliminary analysis on the acetate resin of the fast moving organic acids of the tobacco leaf provides evidence that there are seven or more components in the "undetermined acids" fraction.

THE RECORD OF THE NATIONAL COTTON COUNCIL OF AMERICA. A record of the council's accomplishments during its sixteen years of existence. After a preliminary discussion of the council's activities, 64 specific achievements are briefly explained. A publication of the National Cotton Council of America, Post Office Box 18, Memphis, Tenn.

CHANGING FERTILITY OF NEW ENGLAND SOILS. The purpose of this bulletin is to bring together the lines of evidence that indicate fertility trends in New England soils. These trends include data relating both to forested and cultivated soils, although the information is more complete for the cultivated soils. This study should serve as a useful guidepost in pointing up the future direction of agricultural development both in New England and the United States. Catalog No. A 1.75:133, U. S. Government Printing Office, Division of Public Documents, Washington 25, D. C.

INSPECTION OF AGRICULTURAL SEEDS. This reports the inspection of agricultural seeds from July 1, 1953 to June 30, 1954. Contains 59 pages including 9 tables, the most important of which is an analysis of samples reported as seriously misbranded. November, 1954, Circular 405, Purdue University Agricultural Experiment Station, Lafayette, Ind.

NEW BOOKS

Qualitative Organic Analysis, by Alexander McGookin. Published by Reinhold Publishing Corp., New York. 155 pages, price $4.50.

The book is designed for beginning students of organic chemistry and biochemistry. Fundamentals of organic analysis are discussed with emphasis on scientific method rather than laboratory technique. The author is senior lecturer in organic chemistry at The University, Liverpool, England.

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Cotton Growing Problems, by Basil G. Christidis, and George J. Harrison. Published by McGraw-Hill Book Co., New York. 633 pages, price $9.75.

The book is a complete review of world literature on cotton growing, with special emphasis on problems of growers in the United States. Chapters on breeding, leading varieties, fertilizer use, seed bed control, weed control, and harvesting methods are included. Ginning and marketing are not discussed. Recent advances covered include methods of hybridization, effective control of cotton insects, and the mechanization of growing and harvesting the crop. The material is organized for text use, although sufficient documented information is included to make it a valuable reference.

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Index XIII of American Economic Entomology, compiled by Ina L. Hawes. Published by Entomological Society of America, Washington, D.C. 303 pages, price $3.00.

The index covers the literature received during 1953. The geographic range of the index is continental North America, including Alaska, Canada, Mexico and the Panama Canal Zone. Some material published in Cuba, Puerto Rico and Hawaii has also been included. Scientific names of insects and other subjects are arranged alphabetically; also references by author under the subject. Several entries under the same author are also arranged alphabetically, by the titles of the publications in which the articles appear.

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American Cyanamid Announces New Systemic "Thimet"

A NEW systemic insecticide called "Thimet," which has proved to be particularly effective on early-season cotton pests when used as a seed treatment, was announced by American Cyanamid Co., New York, at the Cotton Production Conference held in Memphis, Tenn., December 14. When cotton seed is treated with the new systemic, the insecticidal effect persists in the growing plant up to nine weeks after emergence, thus taking the place of two to four spray applications that the cotton farmer would normally apply during this period. Estimated cost of seed treatment is $3.00 per acre.

It is anticipated that "Thimet" will be marketed on a limited scale to cotton seed dealers in Texas and Mississippi for treatment of seed to be planted during the 1956 season. In addition to the preliminary test work on cotton conducted in 1955, both seed treatment and direct spraying tests were made with promising results on corn, peas, beans, lettuce, beets, peanuts, potatoes, tree fruits and tobacco seedlings.

Originally designated as Experimental Compound 3911 by American Cyanamid Co., "Thimet" chemically is O, O diethyl S-isopropylmercaptomethyl dithiophosphate.

The U. S. Dept. of Agriculture dealt with this new systemic in a release, December 12, which reviewed comments on this new product and several others by Dr. Clyde F. Rainwater of USDA's Agricultural Research Service before the Cotton Production Conference in Memphis, December 16. He indicated that the USDA prefers to have such new seed treatments tried on a limited grower basis before general recommendations are made for widespread use. 3911, he reported, was tested extensively during 1955 by state experiment station entomologists in Texas, Louisiana, Arkansas, Alabama, Georgia, North and South Carolina, and by USDA entomologists in Arizona, Texas, Louisiana, Mississippi and South Carolina.

He reported that "at all locations where this organic phosphorus compound was tested, thrips, aphids and spider mites were controlled for periods of 3 to 7 weeks after plant emergence. At some locations, the insecticide controlled cotton fleahoppers for about 4 weeks following plant emergence. Leaf miner and whitefly damage did not occur in some of the treated plots, but a high percentage of leaves were infested by these insects in the untreated check plots. At one location, cutworms were also controlled.

"Some research workers found that 3911 controlled boll weevils to a certain degree, while other workers did not. Apparently, these differing results were due to a difference in the time boll weevils entered the cotton fields. Duration of the insecticide's effectiveness — 3 to 7 weeks after plants emerge — may not always be long enough to catch late migration of weevils to cotton.

"This compound, more toxic than any insecticide presently recommended for cotton, demands extreme care in its use. Custom treatment of planting seed by trained personnel under carefully controlled conditions appears to be the only safe application method. Thus, farmers need not handle the concentrated insecticide. They would come in contact with it only when they place treated seed in the planting hopper. By using rubber gloves and taking reasonable precautions, the health hazard from the chemical can be eliminated or reduced to a minimum."

Mr. Rainwater reported that several other new systemic insecticides are also under observation and further investigation, either in the laboratory or in limited field trials. In laboratory tests, seven of these chemicals proved highly effective against aphids and spider imites, two worked well against thrips, and five others were effective against the boll weevil.

Symposium on Nitrogen Fixation Sponsored by FMC and WARF

OPERATION of a successful semi-commercial process for nitric acid directly from the atmosphere was described recently at a symposium at the Westchester Country Club, New York, sponsored by the Food Machinery and Chemical Corp. and the Wisconsin Alumni Research Foundation.

FMC and WARF cooperated in the development of the process which resulted in a 40 ton per day plant built and operated by FMC for some eighteen months at Sunflower Ordnance Works, Lawrence, Kansas for Army Ordnance. Dr. Farrington Daniels, University of Wisconsin, presided at the Westchester Symposium. Representatives of government departments and a wide cross-section of industry were in attendance at the two-day meeting.

Early work on high temperature fixation of nitrogen to yield oxides of nitrogen and nitric acid began at the University of Wisconsin under the direction of Dr. Daniels in 1939 at the suggestion of Frederick G. Cottrell. There it was found that temperatures of the order of 3900°F could be achieved and good yields of nitric oxide could be obtained in a regenerative pebble-bed furnace. The Wisconsin work was financed by the WARF. Food Machinery and Chemical Corp. assumed responsibility for the development of a large scale process in 1946. Following the building of a number of pilot scale furnaces, the moving bed principle was developed which eliminated the sintering and plugging problem inherent in fixed refractory pebble beds. The Sunflower plant also made use of an improved and unique recovery system, based on the use of fluidized solids in recovery and concentration of the dilute oxides of nitrogen. Following the production of 2,400 tons of equivalent 100% nitric acid at Sunflower, the semi-commercial plant was shut down by mutual consent, all important data having been obtained.

Although further development will be required to realize the economic advantages for large scale use, widespread industrial interest led to the calling of the two-day Nitrogen symposium.

INDUSTRY *News*

Jones V P at Arkell

Mr. Tom L. Jones has just been appointed a vice-president of Arkell and Smiths, New York. Mr. Jones will be in charge of the eastern sales division. Previously, he had been central division sales manager with offices in Columbus, O.

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Minerals & Chem Moves to NJ

Minerals & Chemicals Corp. of America, including subsidiary companies: Speed-Dri Corp., and the Minerals Separation Division, will move their entire Philadelphia Pa., and Metuchen, N. J. operations to new general offices at Menlo Park, N. J.

Transfer of the research facilities from Camden, N. J., Carlsbad, N. M., Lakeland, Fla., and McIntyre, Ga., to the new Minerals Research Center at Menlo Park is scheduled for January 15.

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Meyer Firm Opens Denver Ofc

Wilson & Geo. Meyer & Co., Intermountain, Pacific Coast distributors of agricultural and industrial chemicals, announced last month opening of a new office in Denver, in charge of Jerome Brim.

The new office, located at 851 North Broadway, was opened primarily to handle distribution, in the mountain and plains states, of the concentrated phosphate products of Western Phosphates, Inc., Garfield, Utah. Western Phosphates, Inc., is jointly owned by American Smelting and Refining Co., Kennecott Copper Co. and Stauffer Chemical Co. Wilson & Geo. Meyer & Co. Intermountain is exclusive sales agent for the 135,000-ton annual output of its plant.

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Nitro Div. Names Hunter VP

Malcolm E. Hunter has been appointed a vice president of Nitrogen Division, Allied Chemical & Dye Corp., New York. He will continue to be in charge of sales, having formerly performed this function as assistant to the president. Mr. Hunter has been a sales executive in Nitrogen Division for five years. Prior to that, he was general sales manager of the fertilizer division of Virginia-Carolina Chemical Corp., Richmond, Va.

Dutton Heads A R I

At its fourth annual meeting held on October 17-18 in Washington, D. C., the Agricultural Research Institute of the National Academy of Sciences, National Research Council installed as president Walter C. Dutton, of the Dow Chemical Co., Midland, Mich.

Other officers are: vice president — Max T. Goebel, E. I. DuPont de Nemours & Company, Inc.; and Secretary — Norman F. Kennedy, Corn Industries Research Foundation.

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S.W. Potash Names Devlin

Southwest Potash Corp., New York, announce the appointment of James J. Devlin as sales manager.

Predict Increase in Pyrethrum Insecticide Use

A STEADILY increasing consumption of pyrethrum both in the United States and abroad was predicted by Russel B. Stoddard, Fairfield Chemical Division, Food Machinery & Chemical Corporation, in a talk "Outlook for Pyrethrum Supplies" at the annual meeting of the Chemical Specialties Manufacturers Association held at the Hotel Roosevelt, New York, December 5-7. Mr. Stoddard suggested that consumption of pyrethrum flowers in the United States might increase by as much as 20% in 1956 under the impact of the Miller Bill and the increasing emphasis on safety in control of insects. He suggested that outside the United States, the rate of increase in pyrethrum consumption might be even higher due to growing awareness of the merits of pyrethrum type insecticides, increasing difficulties with resistant insects, and most important of all, higher standards of living and comfort.

He recalled that in 1946, pyrethrum had been completely written off as an obsolete insecticide raw material and that matters at that time were further complicated by the existence of stocks of close to 5,000 tons of pyrethrum flowers as a carry-over from the war days. During that period, pyrethrum production obviously looked unattractive and growers embarked on a program of converting their pyrethrum acreage to other crops. It was not until 1950 that the carry-over surplus had been consumed and consumption once more exceeded production.

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During the past four years, consumption in the U. S. has fluctuated within narrow limits, while there has been a steady and accelerating increase in use outside the U. S. To a very great degree, the rapidity with which pyrethrum has regained a major place in the insecticide field is due to the development and production of effective synergists such as piperonyl butoxide.

U. S. consumption of pyrethrins during 1955, Mr. Stoddard indicated, will total approximately 85,000 to 95,000 lbs. Consumption outside the U. S., he estimated in the neighborhood of 50,000 lbs. To meet the increased demand which is anticipated in 1956, pyrethrum users will still have to look almost entirely to Africa and the Belgian Congo. Brazilian production which was substantial 10 years ago dropped to practically zero and has never recovered. Japanese production reached a high of over 2,000 tons of flowers in 1953 but has since fallen off to a point where it is no longer adequate for the requirements of the domestic market. Japan will not in the foreseeable future be an exporter of pyrethrum. Production is proceeding on a small scale in Ecuador. Tonnage available from that area during the next few years, however, will be minor. African production, Mr. Stoddard predicted, is increasing and will continue to increase. He believes that the visible supply of pyrethrum for 1956 is adequate to support the suggested increase in consumption both in the United States and abroad. The same prediction was also extended into 1957 but it was suggested that if demand continues to increase in the following years, only a major and rapid increase in world production of pyrethrum will be adequate to meet a rising demand curve.

Should demand for pyrethrum expand substantially, allethrin is available to supplement the supply of the naturally grown flowers. Use of allethrin has been limited up to the present because it exhibits a limited range of effectiveness against insects, and up to the moment it has not been possible to develop a truly satisfactory and effective synergist for allethrin. However, should demand for pyrethrum type insecticides develop far exceeding the pyrethrum supply, allethrin could and would serve to keep matters in balance and prevent shortage or runaway markets.

Mr. Stoddard predicted that the relatively close balance between supply and demand over the next year or two will probably stabilize the price of pyrethrum. He predicted a moderate price increase and suggested that lower prices could not be anticipated, because any important reduction in price will tend not only to discourage increased production but actually to reduce it by throwing marginal growers out of production. In the case of synthetic chemicals, he pointed out, increases in production usually go hand in hand with decreased cost due to manufacturing economies. In the case of naturally grown products, however, the reverse situation is true and increased production requires at least maintenance of price.

He summarized the future outlook for pyrethrum supplies as follows:

1—There is no danger of a major price advance and no possibility of an appreciable decline.

2—Available supplies are adequate to support a substantial increase in demand without danger of shortages.

3—Even in the event that demand should skyrocket beyond predictable estimates, the situation will not be critical.

Agronomists and Fertilizer Industry Men to Meet in Chicago

AN attendance of more than 500 is expected at the forthcoming annual February joint meeting of Midwestern college agronomists and fertilizer industry representatives at the Edgewater Beach Hotel in Chicago. The two-day meeting, sponsored by the Middle West Soil Improvement Committee, will be held February 16 and 17.

Reports by college agronomists on the latest research to promote more efficient fertilizer use will headline the program. The program will include special reports by soils specialists from four of the MWSIC states—Kentucky, Michigan, Minnesota and Nebraska. Starting this year, it is planned to set up a rotation whereby every three years, all of the 13 MWSIC states will be covered by comprehensive round-up reports on research.

On the program, too, will be discussions of soil insecticides, their response and new developments in methods of application. Factors that motivate farmers in adopting new and improved methods will come in for attention. Dr. Kermit C. Berger, University of Wisconsin will be chairman of the meeting. W. M. Newman, president of the Middle West Soil Improvement Committee, and Z. H. Beers, executive secretary, will welcome the soils men and visitors.

Of particular interest this year will be a dramatic presentation by two Iowa State College specialists on "How Farm People Accept New Ideas." Joseph M. Bohlen and George M. Beal, of the economics and rural sociology department will stage the presentation.

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Midwestern Shade Tree Conf.

The 11th annual meeting of the Midwestern Chapter of the National Shade Tree Conference will be held February 22-23-24, 1956, in the LaSalle Hotel, Chicago, Illinois. The program is primarily directed to discussion of problems of concern to those who perform tree work in the midwest, but included also are topics of interest to arborists from all sections of the country.

Included on the program are the following topics of review: "Dutch Elm Disease Control Program — Sanitation" by Dr. Richard Campana, Illinois Natural History Survey, Urbana, Ill.; "Dutch Elm Disease Control Program—Spraying" by Ernie F. Herrbach, Standard Oil Co., Chicago; "Insect Problems of the Arborist" by Dr. Donald L. Schuder, Purdue University, Lafayette; "Use of Liquid Fertilizers" by Dr. Paul E. Tilford, National Arborist Association, Wooster, Ohio.; "The Use of Herbicides Near Ornamentals" by Dr. L. C. Chadwick, Ohio State University, Columbus, Ohio; "Anthracnose on Shade Trees and Control Measures" by Dr. J. C. Carter, Illinois Natural History Survey, Urbana, Illinois.

Bemis Names Baltimore Mgr.

Bemis Bro. Bag Co., St. Louis, Mo., have announced the appointment of Stewart Eckers as manager of their Baltimore sales office. Mr. Eckers is a native of Baltimore. In his capacity as manager, Mr. Eckers will supervise Bemis sales in the upper Chesapeake Bay area.

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IMCC Personnel Advances

Dr. E .T. Casler has been advanced to manager of the Florida operations of the Phosphate Minerals Division of International Minerals & Chemical Corp. Dr. Casler succeeds Floyd B. Bowen, who recently was named production manager for the Division's operations in Florida, Tennessee and Montana.

Other appointments in the division are: W. O. McClintock is being advanced to assistant manager for engineering. H. T. Loehr is being transferred to assistant manager for production. H. E. Uhland is being transferred to the post of chief engineer. F. J. Clawson is advanced to chief metallurgist.

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Cascella to Middleport Ofc.

Robert N. Cascella, who for the past year has been in charge of the New York export office for the Niagara Chemical Division, Food Machinery and Chemical Corp., has been transferred to the home office at Middleport, N. Y. to become assistant manager; export sales. Mr. Cascella will be specifically assigned to the handling of the Central and South American markets.

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Dorr-Oliver And Long Merger

Dorr-Oliver Inc., Stamford, Conn., announced plans for the integration of the Canadian operations of Dorr-Oliver with those of E. Long Ltd. of Orillia, Ontario, on January 1, 1956. The new organization will be known as Dorr-Oliver-Long Limited.

Clarence R. Long, presently a director of Dorr-Oliver Inc. and president of E. Long Ltd. will be the president of the enlarged organization. Headquarters will be located in Orillia with the former Toronto office of Dorr-Oliver and the Vancouver office of E. Long operating as divisional sales offices.

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NH_3PO_3 Plant at Tulsa

Ozark-Mahoning Co. plans an ammonium phosphate fertilizer plant at Tulsa, Okla., at a cost of over a million dollars. The plant will have a capacity to produce about 50,000 tons of high analysis water soluble complex fertilizers. The products will be sold under the Ozark-Mahoning trade name.

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Blaw Knox Appointments

Blaw-Knox Co., Pittsburgh, Pa., announced recently the appointment of Arne O. Olson, as vice-president of engineering and procurement. Charles F. Hauck becomes vice president of sales, and Edward S. Wright, vice president of construction and estimating. Keator McCubbin was appointed vice president of midwest headquarters.

Wolf Joins McCarthy

The McCarty Co., Chicago, announces that Albert M. Wolf has been appointed director of their Agriculture Department. Mr. Wolf is an advertising executive and farm management counsellor. He has been consultant to many dairy cattle breeders, and to feed, fertilizer, and other companies selling the farmer as well as farm dealers.

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Wilson Named VP of Council

Louis H. Wilson, secretary and director of information of the National Plant Food Institute, has been elected vice president of the Agricultural Relations Council, an organization for those engaged in public relations work in agriculture and allied industries.

Sixty of the Nation's top agricultural public relations executives attended the annual meeting, which was held at the Conrad Hilton Hotel, in Chicago, on December 1.

Western and California Weed Control Conferences Feb. 15

THE Western Weed Control Conference and California Weed Control Conference will meet jointly at Sacramento and Davis, California February 15-16-17, 1956. Invitational speakers from England, Canada and New Zealand will lend an international flavor to the proceedings. Representatives from the NACA, WACA and state and federal agencies are also included on the program.

Meetings on February 15 and 16 will be held in Sacramento, at the Governors' Hall, California State Fairgrounds. On February 17th the conference will move to the campus of the University of California at Davis—within easy driving distance of Sacramento. Convention head quarters will be set up at Hotel Senator in Sacramento, with additional opportunities for registration at Governors' Hall, California State Fairgrounds, and University Airport, Davis.

Walter S. Ball
President of the Western Weed Control Conference

The tentative program released indicates a complete coverage of the weed problem, damage and control.

Participating in this review will be W. W. Allen, Dow Chemical Co., Midland, Mich.; Henry Wolf, Washington State College, Pullman; Dan Watkins, Ivon Watkins, Ltd., New Plymouth, New Zealand; Arne Carlson, E. I. duPont de Nemours & Co., Wilmington, Delaware; and E. G. Anderson, Secretary, National Weed Committee, Canada.

On February 16th, the California Weed Control Conference section will lead off with a report on "Our New Frontiers" by W. A. Harvey, Extension Weed Specialist, University of California, Davis. "Agencies Involved in Weed Control in California—What They are Doing and What it Costs" will be discussed by Milton D. Miller, University of Cal-

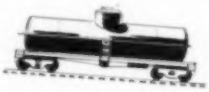
A Winning Hand . . .

5 PHILLIPS Fertilizer Materials for High Analysis Mixtures

1 Ammonium Sulfate

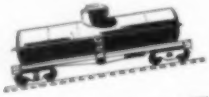
New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 Anhydrous Ammonia



Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

3 Nitrogen Solutions



Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low; help rapid, thorough curing.

4 Ammonium Nitrate

Phillips *66* Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills or pellets resist caking, handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for uniform free-flowing properties in formulations and top-notch crop response as a direct application material.

5 Triple Superphosphate

Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

Offices in:
AMARILLO, TEX.—*First Nat'l Bank Bldg.*
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DENVER, COLO.—*1375 Kearney Ave.*
DES MOINES, IOWA—*606 Hubbell Bldg.*
HOUSTON, TEX.—*1020 E. Holcombe Blvd.*
INDIANAPOLIS, IND.—*1112 N. Pennsylvania St.*
KANSAS CITY, MO.—*500 West 39th St.*
MINNEAPOLIS, MINN.—*212 Sixth St. South*
NEW YORK, N. Y.—*80 Broadway*
OMAHA, NEB.—*WOW Building*
PASADENA, CALIF.—*604 Citizens Bank Bldg.*
RALEIGH, N. C.—*804 St. Mary's Ave.*
SALT LAKE CITY, UTAH—*68 South Main*
SPOKANE, WASH.—*521 E. Sprague Ave.*
ST. LOUIS, MO.—*4251 Lindell Blvd.*
TAMPA, FLA.—*1214 South Dale Mabry*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

ifornia, Davis; Boysie Day, University of California, Riverside; A. Jensen, American Cyanamid Co., Orinda; R. M. Howie, Riverside County Dept. of Agriculture, and C. M. Gordon, rancher of Woodland." "Brush Control with Chemicals" by O. A. Leonard, University of California, Davis, and a panel on "Weed Control in Irrigated Crops" by Warren Hageman, California Packing Corp., (Vegetable Crops); C. L. Foy, University of California, Davis, (Cotton); and E. E. Stevenson, (Beans).

Friday's joint session will move to the University Airport at Davis. There the conference members will have an opportunity to view exhibits of agricultural aircraft and application equipment; exhibits of ground equipment; and continuous movies of weed control work. Flight demonstrations of agricultural aircraft and a tour of planes and ground equipment will round out the morning session.

Officers of the Western Weed Control Conference are: president, Walter S. Ball, California Dept. of Agriculture; vice-president W. A. Harvey, University of California, Davis; secretary-treasurer, W. C. Robocher, ARS, USDA, Reno, Nevada. The California Weed Conference officers are: president, Paul F. Dresher, American Chemical Paint Co., San Jose; vice-president James W. Koehler, California Dept. of Agriculture, Los Angeles, and secretary, J. T. Vedder, Chipman Chemical Co., Bakersfield, Calif.

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Calspray Building Contracts

The California Spray-Chemical Corp. has awarded a contract to San Francisco's Barrett Construction Co. for a new bulk storage warehouse at Calspray's main plant in Richmond, California. Approximately 500 feet of the new warehouse will be used to store various forms of pelletized, dry, chemical fertilizers and ammonium sulfate. These materials will all be stored in bulk form. The remaining 80 feet of the building will house bagging and shipping facilities.

The F. P. Lathrop Co. will construct a second building to house office facilities.

Vulcan Sales Conference

The growth and progress of the company's pail and drum business was the subject discussed at the sales conference held recently by Vulcan Steel Container Co., at their main office and plant in Birmingham, Ala.

Those attending the conference included Gordon D. Zuck, president, Ray I Mitchell, sales manager, Paul A. Jones, plant manager, Ruth Janet Brown, personnel director, Weyman Snuggs, Charles E. Baker, David Baker, Carlyle West, Fred Palmer, Robert Sheahan, William Tate, James Williams, Robert Crump, William Palmer, Michael Long.

AmPotash Parathion Plant

American Potash & Chemical Corp., is building a plant for the production of technical parathion at its Eston Chemicals Division plant, Los Angeles. The company reports that output of the new plant (which is scheduled to go into production early in 1956) will be solely for the company's needs and the western requirements of California Spray Chemical Corp., Richmond, Calif.

•

Expansion of Fertilizer Facilities

Midland Cooperatives, Chicago, report an expansion of oil and fertilizer facilities in 1955 at an annual meeting in Minneapolis, December 5-6. A. J. Smaby, general manager, reported the co-op in 1955 had built four liquid fertilizer plants, 21 bulk fertilizer depots, five L-P gas plants, and ten petroleum transport terminals. Sales hit an all-time high of $32-149,000, and preferred stockholders received 4% interest.

•

Review of Entomology

The first volume of a new series of entomological books was announced recently by the Entomological Society of America. The text is scheduled for publication early in February. Members of the ESA should contact the society directly for more information on the book.

The book reviews insect nutrition, arthropod resistance to chemicals, the chemistry of insecticides, apparatus and application of insecticides, a discussion of repellents, etc.

Edward A. Steinhaus is editor of the book, while Ray F. Smith is the associate editor.

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New Missouri Poisons Act

The new Missouri Economic Poisons Act of 1955, which regulates the registration, labeling, standards, distribution and sale of economic poisons in the State, went into effect on January 1, 1956.

Under the new law every economic poison distributed, sold or offered for sale within the state of Missouri or transported into or within the state must be registered with the Commissioner of Agriculture. Applications for registration forms are obtainable from the Missouri Dept. of Agriculture, at Jefferson City.

•

Illinois Farm Crop Meeting

At its annual meeting in Chicago, it was reported that the Illinois Farm Supply Co. last year completed erection of a new $4,000,000 fertilizer plant at Tuscola, Ill. Assistance was also given local member co-ops in setting up bulk blending facilities which have increased in number from 22 at the start of 1954 to 45 at the close of the year. Many of these small local co-ops have aggressive plant food programs with directors who are highly trained in the field of agronomy and know the practical side of soil fertility.

Proper Formulation Assures Positive Action . . .

A pesticide formulation built on Diluex or Diluex A will give the best assurance of adequate field performance. Foilage penetration, uniform coverage, improved adhesion, and minimum toxicant fractionation can be obtained in dusts properly conditioned with these quality products.

. . . and on the *underside* of the plant leaves, too!

GRANULAR PESTICIDE FORMULATIONS

Adsorptive FLOREX granules offer a superior base for granular soil pesticides, mosquito control formulations and insecticide-fertilizer additives. Available in standard meshes 30/40, 30/60, and 16/30. Special meshes tailored for experimental formulas.

Write for complete specifications and samples; our technicians are available to help with your processing operations.

FLORIDIN COMPANY

Adsorbents
Desiccants
Diluents

Fertilizer Prices Stable

The U.S. Department of Agriculture, at the 33rd annual Agriculture Outlook Conference held in Washington late in November, advised that fetrilizer prices are expected to remain fairly stable in 1956, after declining about 4 percentage points from the average for 1947 to 1949. It was reported that quantities of nitrogen and potash that will be available for use as spot fertilizer for the year ending June 30, 1956, are expected to be more than 4% larger than during the preceding year. Supplies of phosphoric oxide in 1955-56 are expected to be about the same as those available in 1954-55.

Although the quantity of all fertilizers used in 1953-54 was about 640,000 tons less than 1952-53, the lower tonage contained nearly 250,000 tons more plant nutrients. One of the reasons for the increase in use of principal plant nutrients has been the continued rise in the analysis of fertilizers.

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Clark Named V. P. of Pennsalt

Lee H. Clark, general manager of the Pennsylvania Salt Manufacturing Co.'s Sharples Chemicals Division, has been named vice president of the parent company. While the scope of Mr. Clark's new office was not disclosed, it is understood that his major duties will be concerned with corporate organization and planning functions.

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Stedman Names Krueger

Harold R. Krueger recently joined the sales staff of Stedman Foundry and Machine Co., Inc., as sales engineer for the states of Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Ohio, Oklahoma, Tennessee, Texas, West Virginia and Mexico.

Mr. Krueger comes to the Stedman organization from the Snyder Chemical Co., Topeka, Kansas and was previously associated with the Phillips Petroleum Co., in Bartlesville, Oklahoma, and International Minerals and Chemical Corporation in Chicago.

New Appointees at Crag

C. D. Fischer (left), and M. J. Siciliano (right) have been appointed to new positions in the Crag Agricultural Chemicals Division of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corp., New York. Mr. Fischer has been named assistant to the manager of the division. Mr. Siciliano has been appointed product manager in charge of sales.

•

Calspray District Managers

California Spray Chemical Corp., Richmond, Calif., recently announced the following managerial appointments:

Earl Lanier Stripling, Jr., becomes district manager for the Southeast, with offices at Goldsboro, North Carolina. He will supervise Georgia, South Carolina, and part of North Carolina operations.

James P. Toffaleti is new district manager of the South Central District, with headquarters in Shreveport, La. He will supervise operations for Louisiana, Oklahoma, most of Texas, and adjacent parts of Arkansas and New Mexico.

Cecil M. Crutchfield will be the new district manager of the Mississippi Delta area. From his office in Troy, Alabama, Crutchfield will supervise operations in Alabama, Mississippi, and the adjacent parts of Arkansas, Florida, and Tennessee.

•

Spencer Research Center

A new modern chemical research center for Spencer Chemical Co., Kansas City, Mo., will be erected southwest of Kansas City in suburban Johnston County, Kansas, and should be completed by the spring of 1957. Research studies on the development of new and improved products in the general fields of industrial and agricultural chemicals and plastics will be conducted in the new center.

Southern Weed Conf. Jan. 16

More than 300 agricultural scientists are expected to attend the ninth annual Southern Weed Conference, January 16-18, 1956, at the Jung Hotel in New Orleans, Dr. G. C. Klingman, conference president, announced last month.

High on the agenda, to be discussed during the conference, will be weed control in field crops, cotton, horticultural crops, control of woody plants, plant physiological problems in herbicidal investigations, extension and educational programs in weed control and other special weed problems.

Dr. M. B. Weed, program committee chairman, indicated that a complete program would be released at a later date. Attending will be representatives from USDA, state experiment stations, extension services, vocational agriculture, the agricultural and farm equipment industries and farm leaders.

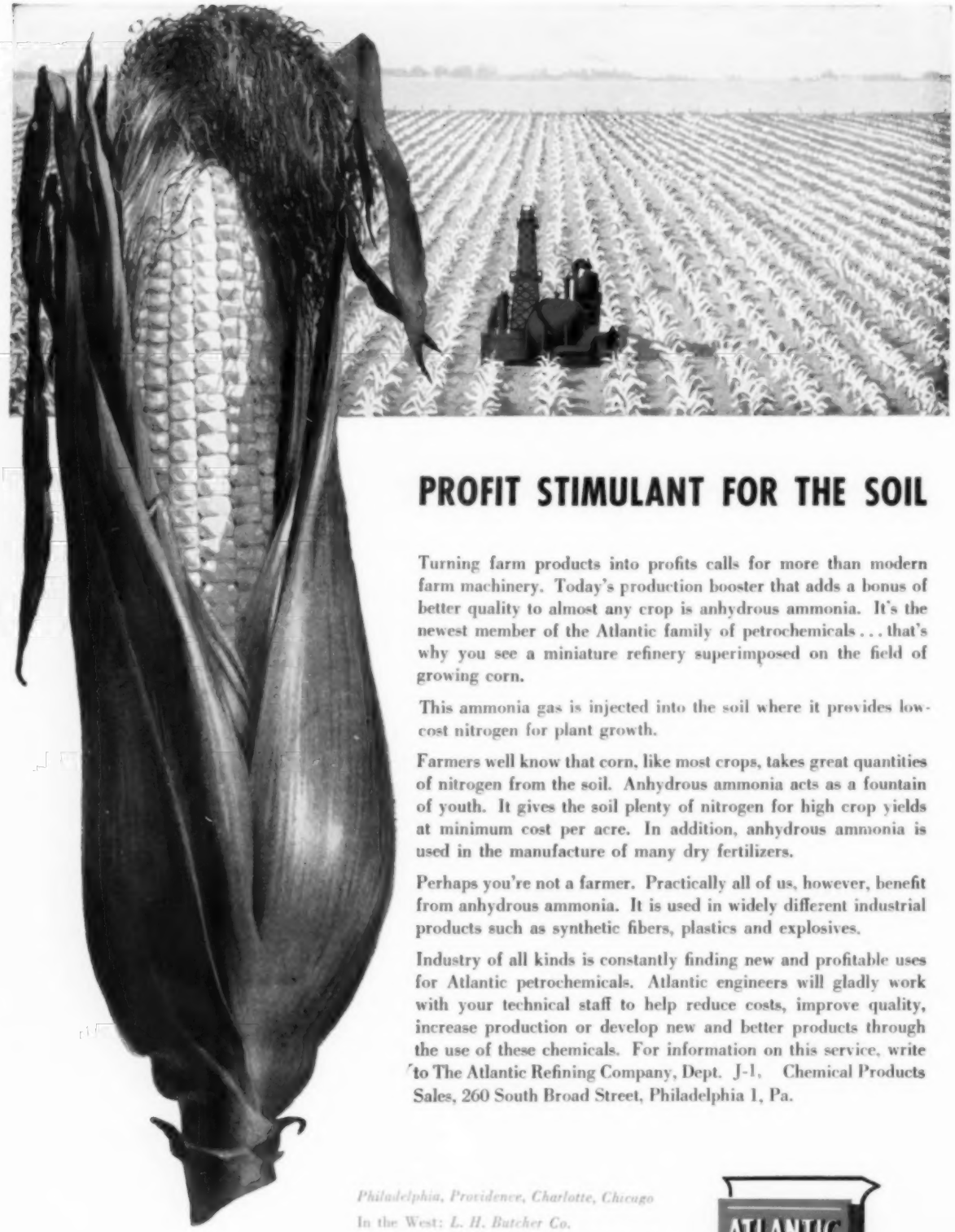
•

Truitt Addresses Alabama Soc.

Paul T. Truitt, executive vice president of the National Plant Food Institute, told members of the Alabama Soil Fertility Society that "the modern trade association has broadened its concept of treating industry interests in terms of the public welfare." He spoke at a luncheon meeting of the Society held at the Whitley Hotel in Montgomery, Ala., December 9th.

Speaking as an official of an association representing the fertilizer industry, he said that "the yardstick we most frequently use in our programs is centered around the philosophy that 'if it isn't good for the farmer, it isn't good for the industry that serves the farmer.' "

" 'The public be damned' attitude is going and soon will be gone in this country," he continued. "To be sure, trade associations are interested in the welfare of their respective industries—and that is why they are organized—but they seek to advance that welfare by methods geared to the total economy, not just one part of that economy, namely, their own interests."



PROFIT STIMULANT FOR THE SOIL

Turning farm products into profits calls for more than modern farm machinery. Today's production booster that adds a bonus of better quality to almost any crop is anhydrous ammonia. It's the newest member of the Atlantic family of petrochemicals . . . that's why you see a miniature refinery superimposed on the field of growing corn.

This ammonia gas is injected into the soil where it provides low-cost nitrogen for plant growth.

Farmers well know that corn, like most crops, takes great quantities of nitrogen from the soil. Anhydrous ammonia acts as a fountain of youth. It gives the soil plenty of nitrogen for high crop yields at minimum cost per acre. In addition, anhydrous ammonia is used in the manufacture of many dry fertilizers.

Perhaps you're not a farmer. Practically all of us, however, benefit from anhydrous ammonia. It is used in widely different industrial products such as synthetic fibers, plastics and explosives.

Industry of all kinds is constantly finding new and profitable uses for Atlantic petrochemicals. Atlantic engineers will gladly work with your technical staff to help reduce costs, improve quality, increase production or develop new and better products through the use of these chemicals. For information on this service, write to The Atlantic Refining Company, Dept. J-1, Chemical Products Sales, 260 South Broad Street, Philadelphia 1, Pa.

Philadelphia, Providence, Charlotte, Chicago

In the West: *L. H. Butcher Co.*

In Canada: *Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.*

In Europe: *Atlantic Chemicals SAB, Antwerp, Belgium*

ATLANTIC PETROLEUM CHEMICALS

The new Agricultural Ammonia Institute Executive Committee, which will guide affairs of the trade association for the agricultural ammonia industry in 1956, includes:

(left to right, seated) Tully W. Talbot, Chemco, Audubon, Iowa, first vice president; Maj. Gen. Ralph H. Wooten, Mid-South Chemical Corp., Memphis, Tenn., and Charles M. Corken, Corken's Inc., Oklahoma City, second vice president.

(standing, left to right) M. H. Carter, Farmers Supply Corp., Greenwood, Miss., secretary; L. H. Wright, Phillips Chemical Co., Bartlesville, Okla., member; M. O. Rasberry, Delta Liquid Fertilizer Co, Helena, Ark., treasurer; and Mark C. Craft, Midwest Fertilizer Co., Springfield, Ill., retiring AAI president and committee member.

Argicultural Ammonia Institute Attracts 400

"AMMONIA tonnage figures for 1955 continued substantially upward, totaling some 414,300 tons for the year ending June 30, 1955 and representing an increase of 24.4% over the previous year." This situation was called to the attention of those attending the 5th annual convention and trade show of the Agricultural Ammonia Institute, held December 5-7 at the Municipal Auditorium, Kansas City, Mo. These facts and others concerning the ammonia industry were reported by the retiring president, Mark C. Craft, Mid-West Fertilizer Co., Springfield, Ill. In further comments to his audience, Mr. Craft, advised that "the future to a great degree will be what we make it. We have passed through the trying period of short supply. We are well into the era of over-supply. At some point in the not-too-distant future, we will inevitably find that production will level off on a plane closely paralleling that of maximum demand.

"Our objective then should be to hold and increase our share of the nitrogen market in a manner that will return a fair and reasonable profit to those in this business, and at the same time provide a necessary service to those farmers who can win some of their own skirmishes in the battle for existence and progress through the use of our high-analysis fertilizer."

In discussing some of the recent problems of this relatively new industry, Mr. Craft indicated that price-cutting seems to be of major concern to a number of distributors in the field. He cautioned that "increased use of anhydrous ammonia will never be brought about by the simple procedure of taking each others' customers. We must have new business, new crops, new areas and increased application rates. Any or all of these can be accomplished by one means, and one means only—increased effort." He added that it is necessary to "sell the farmer what he needs, based on knowledge of his operation. Help him with his other fertilizer requirements. In short, help him make money; otherwise, both you and your customer will be out of business in short order."

Distributor Problems

ANOTHER report which was received with much interest by the AAI attendance was one dealing with "Distributor Problems" presented by J. H. Andrew, Andrew Farm Store, Jefferson, Iowa. In his discussion of the subject, Mr. Andrew indicated that if he were asked to sum up the problems of ammonia distributors, he would say "the present day distributor has a large investment in a seasonal business, and is selling a new product by poor merchandising to an uninformed public in a competitive market." Further discussing these various points, Mr. Andrew advised that because the cost of owning a 30,000 gallon storage tank often amounts to more than $1,000 per year, many distributors owning such permanent storage feel that ammonia producers should compensate them for the storage by leasing the tanks for off-season storage of ammonia. Several producers, reports Mr. Andrew, have already adopted limited plans of this type. Most distributors feel that this rental payment should be large enough to offset the high costs with which they are faced.

Still another problem, pointed out by Mr. Andrew, is that some distributors, who have as their sole business the distribution of agricultural ammonia, have only a seasonal income source good for three or four months of the year. The continuous overhead and living expenses however, have to be borne for the remaining eight months. Mr. Andrew suggested that ammonia distributors should have their businesses allied with other lines, which would have year round potential. "I would strongly suggest," he said, "that distributors thoroughly look over the prospects of taking on an allied product. This might be selling livestock feeds, agricultural chemicals, such as weed killers, insecticides, defoliants, and related spraying equipment needed to apply these products; farm seeds; dry or liquid phosphate and potash fertilizers; and others."

The need for improved merchandising and educating the public was also emphasized by Mr. Andrew. "In selling ammonia we should take the approach that ammonia is the new '1956 hard-top model' nitrogen and make the public dissatisfied with some

only CYANAMID supplies the right balance of NITROGEN & CALCIUM for plow down!

CYANAMID supplies an ideal, balanced diet for soil bacteria—21% nitrogen plus all the calcium they need to make maximum amounts of good, rich humus in the soil. That's why CYANAMID is the ideal plow-down fertilizer. Cover crops and crop refuse, when plowed down with CYANAMID, rot thoroughly and rapidly.

What's more, CYANAMID's 21% nitrogen is leach resistant, and *stays* with the crop right through to harvest. For most crops, on most soils, this makes later side- or top-dressing *unnecessary!* And the calcium in CYANAMID —*more* than in any other fertilizer—neutralizes soil acidity.

Here's a real business builder! Once a farmer plows down with CYANAMID he'll be doing it regularly, year after year. So capitalize on all the advantages CYANAMID offers. Tell your customers about CYANAMID and urge them to try it. As it builds profits for *them* in increased yields, it will build profits for *you* in increased sales.

Producers of:
AERO® Cyanamid: Fertilizers—Defoliants—Herbicides
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AERO® Ammonium Sulphate
AMANOL® Nitrogen Solutions
ANHYDROUS AMMONIA
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CYANOGAS® Calcium Cyanide Fumigants
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of the old, 'out-of-date' forms of nitrogen. However, the fact that anhydrous ammonia is new does not make it alone the entire answer to fertilizer needs, because generally phosphate and potash are also necessary."

"Many ammonia distributors," he reminded, "have found themselves at a distinct disadvantage, because they are not selling phosphate and potash fertilizer. In most areas, a balanced fertility program is essential, and I would encourage every ammonia distributor to make available to his customers, phosphate and potash for their needs.

"One thing that most of us distributors seem to have in common is that we are poor mechandisers. Some think that by cutting the price and taking a customer away from a neighboring distributor they are really selling, but to continue to grow, we must constantly find and create new customers and uses for anhydrous ammonia.

"The fact that we are doing a poor merchandising job is shown by the fact that the public is relatively uninformed on anhydrous ammonia and its use. One of the best ways to inform the public about agricultural ammonia is through advertising. Distributors who have consistently used planned local advertising have found it very valuable."

Mr. Andrew concluded by stating that although his report might be thought of as a pessimistic appraisal of the ammonia industry, the fact is that the only way of solving industry problems is by positive thinking, forceful action and active co-operation with one another. We must solve these problems, he said, and build a stable, respected, and enduring business.

Panel Review of NH, Fertilizers

A PANEL discussion on the "Agronomic and Soil Characteristics of Ammonia" was directed by Lewis B. Nelson, USDA, Beltsville, Md. Participating in this panel was Dr. D. G. Aldrich, Jr., University of California, Davis, Calif. who discussed the "Use of Anhydrous Ammonia in Irrigation Water." He suggested that "it be recognized at the outset by those who intend to apply fertilizer in irrigation water that the distribution of plant food in solution is no better than the distribution of the irrigation water in which it is dissolved. Consequently, the application of anhydrous ammonia in irrigation water should be attempted only where soil and irrigation practices permit uniform water application without waste."

Dr. W. V. Bartholomew of the Iowa State College, Ames, Iowa, as panel member, discussed "Nitrogen and Soil Microbes." He remarked that "Nitrogen fertilizers are most advantageously used, not only for crop production but also for building soil organic matter, when properly applied to produce maximum economic crop yields.

"If the nitrogen for crop production can be applied to the residue without impairing yield efficiency, some benefits in speed of residue decay and increased organic matter may result. Highest yields of crops, and the return of large amounts of residue have been shown conclusively to result in the highest level of soil organic matter."

The use of anhydrous ammonia was reported by W. B. Andrews, Mississippi State College, State College, Miss., as final member in the panel discussion. Dr. Andrews remarked that "as compared with other sources of nitrogen, anhydrous ammonia has accounted for itself favorably under most circumstances. The primary losses in the efficiency of anhydrous ammonia, or any other source of nitrogen, are produced by leaching of nitrate nitrogen and by microbial tie-up in the decomposition of crop residues. The application of anhydrous ammonia, or any other source of nitrogen, as close as practical to the time that it will supply the form of nitrogen needed by the particular plant, has proved to be a good practice. Except for small grains on strongly acid soils, fall application for spring consumption has not often been equal to spring application in humid climates, where both rainfall and the efficiency of nitrogen were normal.

"In most cases," he said, "sidedressing corn, with preference for late sidedressing, has been superior to at-planting application, which suggests that sidedressing contributes to more efficient utilization of water and nitrogen for grain production. There are conditions, most likely, where the rainfall is not sufficient to leach beyond the effective root-feeding zone, where fall application of nitrogen is about as effective as spring application. Under these conditions, the unused nitrogen from the previous crop, which is about 50 per cent in the case of corn, would be expected to go through the winter about as well, and would make a marked reduction in the quantity of applied nitrogen required for maximum yields. There are insufficient data to adequately describe the behavior of nitrogen under the different conditions where it is used."

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Safety Council Chairmen

Curtis A. Cox was recently named chairman of the Fertilizer Safety Section of the National Safety Council. He was formerly vice-chairman of the section. E. O. Burroughts, Jr. is the new vice-chairman.

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Pennsalt Enters Aerosol Field

Pennsylvania Salt Manufacturing Co. has announced plans to enter the aerosol propellant and refrigerant fields late in 1956 with the Isotron line . . . a family of chlorofluorohydrocarbons. (Initial products will include trichloromonofluoromethane, dichlorodifluoromethane, and monochlorodifluoromethane. Early additions to the line will be trichlorofluoroethane and dichlorotetrafluorethane.) This expansion is part of Pennsalt's long-range plans for consolidating its established position in the fluorine chemicals industry and to achieve further product diversification.

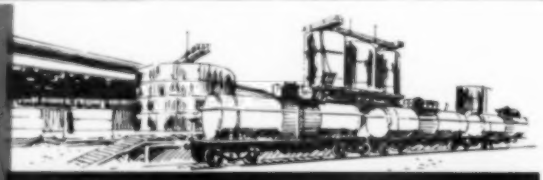
The new Isotron line will be produced in a multi-million dollar plant already under construction at Calvert City, Kentucky. There, in close proximity to its extensive fluorspar mines, Pennsalt has several other plants including a hydrofluoric acid unit from which this major raw material will be pipelined to the new plant.

N. C. Pesticide School, Jan. 10

The 1956 Pesticide School of the North Carolina School of Agriculture is scheduled for January 10-11 at North Carolina State College, Raleigh. N.C. Following an address of welcome by R. L. Lovvorn, A. S. Crafts will address the group on "A Research Approach to Weed Control." W. A. Harvey will outline the weed program at California.

Those attending the meeting will be particularly interested in the 1956 fungicide recommendations which will be outlined by H. R. Garriss. The major changes in control recommendations for 1956 will be outlined by J. D. Jones.

J. C. Ferguson is scheduled to discuss application equipment. A panel discussion on "Soil Fumigation with Nematocides" will include the following participants: L. W. Neilson, J. C. Wells, C. N. Clayton, and C. J. Nusbaum. Several other discussions dealing with research results on tobacco, fruit, cotton, insect control, etc., are scheduled.



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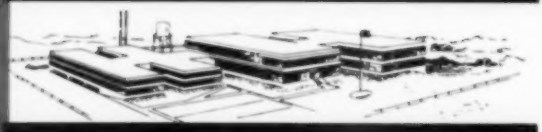

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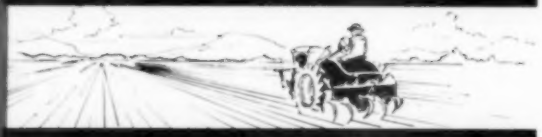

to America's Growers

Here is a check-list of products available for immediate delivery from our strategically located warehouses:

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Captan
Chlordane
Dieldrin
Endrin
Heptachlor
Lead Arsenate
Lindane
Malathion
Methoxychlor
Ovex
Parathion
Sulphenone
Sulphurs
Systox
TEPP
Toxaphene

Seed Protectants
Herbicides
Soil Fumigants
Grain Fumigants
Defoliants
Cattle Sprays
Cotton Dusts

problems are multiplying

. . . for those who supply growers with an ever-increasing number of formulations. Inventory problems, planning of purchases, maintaining a competitive position, and just 'keeping up to date' requires study and planning as never before.

Stauffer can help

. . . by offering the benefits of a *practical* sales policy backed by a complete line of field-proven agricultural chemicals.

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Garden Show Jan. 24

Complete with five growing plots of grass where garden supply dealers will learn both variety characteristics and new recommended methods for growing the best lawns, the Midwest Garden Supply Trade Show will open at Chicago's International Amphitheatre January 24.

This area is one of a series of "educational" displays being arranged so that dealers will know more about the garden products they sell in their stores, will be better able to educate their own clerks and can offer a wealth of latest advice on gardening problems to their customers. Others planned by *Garden Supply Merchandiser* magazine, sponsor of the Show, include model service and repair shops for power equipment used by garden and lawn owners in which manufacturers of engines and accessories will demonstrate repair and service techniques. They also will suggest and illustrate profitable procedures of repair shop operation ranging from delivery to accounting. Allan W. Greene is directing this section. The eastern show will be held at Kingsbridge Armory, New York City, February 7-9.

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New Priddy Granular Plant

The Charles W. Priddy Co., Norfolk, Va., announced recently the beginning of construction of a granular fertilizer unit at its Money Point, Va., plant. The new plant will have a capacity of 20 tons per hour. It will be constructed by E. T. Gresham Co.

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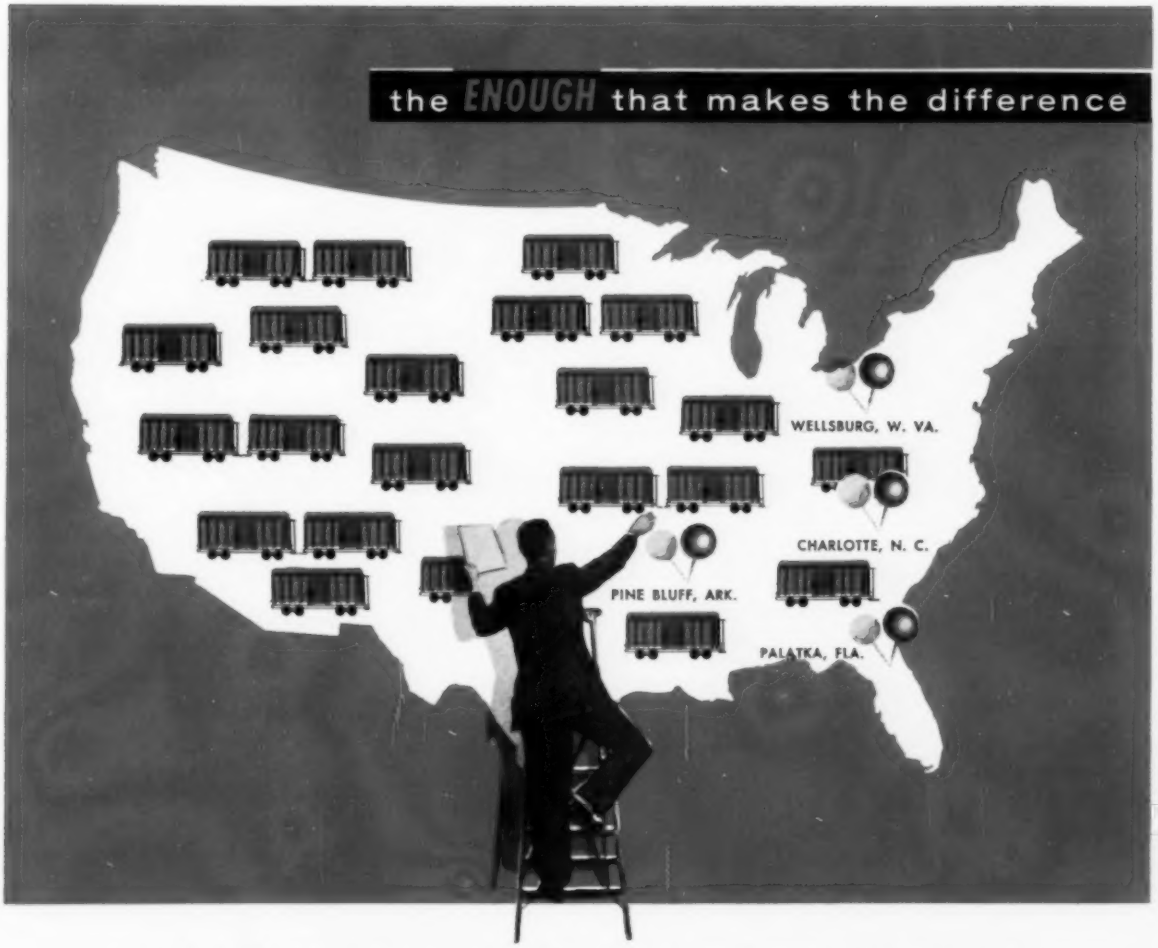
Grace Exec. Changes

Hugh S. Ferguson, president of Dewey and Almy Chemical Co., Division of W. R. Grace & Co., has been named by the Grace board of directors as executive vice president in charge of the chemical group in the parent company. At the same time, the board announced also the election of Alexander T. Daignault as an executive vice president and chief financial officer of the international chemical, trading and financial concern.



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Complete integration from trees to strategically located plants makes centralized and controlled scheduling of Multiwall Sacks a reality at Hudson.

Our traffic board is tonic for the jangled nerves of harassed purchasing men. From the moment your order comes in to Hudson it is carefully scheduled and transmitted to insure delivery to your plant . . . on time and as you want it.

Central plotting continues while the order is in progress through every phase, and daily quality control checks are posted. More than just timely delivery, Hudson Multiwalls arrive with weight accuracy and skilled craftsmanship.

When you need them most, boxcars have a habit of becoming needles in the haystack . . . Hudson's Controlled Scheduling keeps them in sight, 'round the clock and to your door.

THE WHOLLY INTEGRATED OPERATION DELIVERS ON TIME!

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Plants at CHARLOTTE, N. C. • PALATKA, FLA.
PINE BLUFF, ARK. • WELLSBURG, W. VA.

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Yes! We'd like a copy of the 46-page illustrated book on "What to Look for in a Dependable Source of Supply," and details on the Hudson guarantee.

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

I. W. Bales

B. J. Smith

Exec. Changes At Chipman

Chipman Chemical Co., Inc., Bound Brook, N. J., announced a number of organizational changes and transfers recently.

Blanchard J. Smith, who has been district manager of their Texas and Southeastern divisions, becomes a vice president and a director of the Company with offices at the Bound Brook, N. J. headquarters.

I. W. Bales remains as vice president in charge of research and technical service, and also will supervise purchasing and production. C. A. McAloon, who has been secretary and assistant treasurer of the firm, assumes the added duties of comptroller.

Linden E. Harris, agronomist and assistant manager of the Northwest division at Portland, Ore., comes to Bound Brook as director of herbicide research and technical service. Frank J. Seibert, retires as chief chemist and plant superintendent as of February 1, 1956 but will continue to be associated with the company as a consultant.

C. A. F. Holstein returned to the company January 1, 1956 as production manager. He was with Chipman from 1942 to 1952. Roger B. Coleman advances from salesman, railroad division, to assistant railroad divison sales manager.

J. D. Humsey, who has been in charge of the Bound Brook order and billing department, will assist the sales manager on exports. W. S. Meyer, formerly of the Bessemer, Ala. office, will be supervisor of Chipman's three Chicago district plants at Clearing, Ill., North Kansas City, Mo., and St. Paul, Minn.

D. W. McCallum advances from salesman in the Midwest area to assistant district manager, Chicago district. W. B. Parker of the Texas staff, becomes district manager, Pasadena, Tex. territory, and Mr. C. H. Johnson of the Bessemer, Ala. branch becomes district manager of that territory.

Kraus Joins Philipp Bros.

John H. Kraus has joined Philipp Brothers Chemicals, New York as administrative assistant in the agricultural division, and will function as assistant to the general manager.

Prior to joining Philipp Brothers, Mr. Kraus was assistant manager in the wholesale department, Eastern Fertilizer Division, of Olin-Mathieson Chemical Corp., Baltimore. Earlier, Mr. Kraus was administrative assistant to the president of Naco Fertilizer Co., Charleston, S. C.

•

USI to Produce Phosphoric Acid

U.S. Industrial Chemicals Co., Division of National Distillers Products Corp., New York, will build a new plant in Tuscola, Ill., to produce wet-process phosphoric acid. Annual production capacity will be 60,000 tons of 75% phosphoric acid, produced from sulfuric acid and phosphate rock by a process developed by the S. A. Metallurgique de Prayon, a Belgian company. Singmaster and Breyer will engineer and construct the plant, which is expected to start operating at the end of 1956.

U.S.I. already produces sulfuric acid, ammonia and nitrogen solutions at Tuscola. The addition of phosphoric acid to this range of fertilizer raw materials will substantially expand the scope of U.S.I.'s service to fertilizer manufacturers in the midwest farm belt.

•

Expand Sulfuric Prod. Facility

A major expansion of the sulfuric acid production facilities of its East St. Louis, Illinois, works was announced last month by General Chemical Division, Allied Chemical & Dye Corp., New York.

The company stated that the plant's capacity is being stepped up over 35% in order to supply increased demands of the oil, aluminum, detergent and fertilizer industries in the St. Louis area. Construction has already been started and is scheduled for completion by March, 1956.

It was noted that the expanded plant will include "the most modern spent acid decomposition facilities available and the only installation of its kind in that part of the country." This type of equipment permits recovery of sulfur values from oil refinery sludge for use in sulfuric production in place of virgin sulfur or sulfur-bearing ores.

Velsicol Advances Richardson

Velsicol Chemical Corp. announced last month the appointment of F. E. Richardson as assistant manager of the Memphis plant. Previous to his new assignment, Mr. Richardson was chief engineer at the Memphis plant, in charge of expansion design and construction projects.

The Velsicol Memphis plant produces technical heptachlor and endrin insecticides along with such basic chemical products as chlorine, caustic soda, hydrogen and sodium hypochlorite.

•

S. Nitrogen Elects 6 Directors

Election of six new directors to the membership of the board of the recently formed Southern Nitrogen Company, Inc., which is constructing a $14,000,000 petrochemicals plant in Savannah, Ga., was announced recently by John R. Riley, president.

In addition to Mr. Riley, Malcolm Smith, board chairman, and George V. Taylor, vice president, the board now consists of Franz Schneider, former executive vice president and chairman of the executive committee of Newmont Mining Corp. Donald Stuart Russell, president of the University of South Carolina, Richard H. Samuels, vice president of Continental Casualty Co., Richard F. Brown, newly elected vice president in charge of operation of Southern Nitrogen Co., Inc., James A. Lyles, vice president of The First Boston Corp., and W.W. Foshay, partner of the law firm of Sullivan & Cromwell.

The Southern Nitrogen Savannah plant will produce 250 tons a day of nitrogen solutions for fertilizer use, and prilled ammonium nitrate. It is expected to begin production early in 1957.

•

New USI Reforming Unit

A new Girdler reforming unit to produce hydrogen from natural gas has just been completed at the Tuscola, Illinois, ammonia plant of U. S. Industrial Chemicals Co., Division of National Distillers Products Corp., New York.

CHEMOTHERAPY down on the farm . . . .

It is now possible to *inoculate* plants with certain newly developed chemicals to give "built-in" protection against many insect pests. These new chemicals are termed "Systemic" insecticides, and are absorbed into the "system," that is the sap stream of the crop plant — literally giving the plant a chance to "bite back" at its ancient foe.

Man applies these new systemic insecticides by conventional spray methods. Then they are absorbed through the plant foliage, and the sap stream carries them to newly growing tips where they effectively foil the insect's plan for a tender, succulent meal.

Some Systemics are already in use, and scientists expect to find other "medicines" for their ever-growing "prescription counter" that will enable the farmer to protect his growing crop against a host of diseases and infestations.

PENNSALT, a pioneer in the Agricultural Chemicals Industry, plays an important part in the development of Systemics, and these products will join the quality line of PENCO Agricultural Chemicals that are aiding the farmer by increasing his yields of better products and bolstering his economy against losses due to disease and insects.

PENNSYLVANIA SALT MANUFACTURING CO. OF WASHINGTON
TACOMA, WASHINGTON

Philadelphia, Penn., Aurora, Ill., Bryan, Tex., Montgomery, Ala., Los Angeles, Berkeley, Calif., Wenatchee, Yakima, Wash., Portland, Ore.

Pennsalt Chemicals

from this simple flower comes

PYRETHRUM

The wonder insecticide that is the most toxic to insects and the least toxic to humans and warm-blooded animals of *ALL* currently known insecticides.

Prentox Pyrethrum & Pyronyl Concentrates are available for:
Aerosols · Fly & Roach Sprays · Mill & Industrial Sprays
Agricultural & Cattle Sprays · Truck Crop & Garden Insecticides
Grain Protectants

PRENTISS DRUG & CHEMICAL CO. INC. NEW YORK, N.Y.

Try these Prentox Pyronyl and Pyrethrum Pest-Tested Products

Pyrethrum Extract #20 · Pyrethrum Extract #100 · Pyrethrum Extract 20% Pyronyl #20 · Pyronyl #100 · Universal Concentrate · Pyronyl #101 50-5 Oil and Emulsifiable Concentrate · 40-5 Concentrate · 20-8 Concentrate 66-6 Oil and Emulsifiable Concentrate · Pyronyl 75 – The Oil-Free Concentrate Roach Spray Concentrate · Pyrethrum Powder · Dust Concentrate

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DETROIT · SAN FRANCISCO · LOS ANGELES · TORONTO · MONTREAL

Small aircraft prepares to take off on an insecticide mission. Airplane is equipped with an underwing spray boom which discharges the insecticide as an emulsion.

Ground equipment is also used to dust locust - infested acres with insecticide.

Locusts Controlled by Aldrin

Northern and Central Africa and the Middle East encountered severe attacks by the Desert Locust in 1955. This year was the worst infestation of locusts in North Africa since 1867.

In the fight against locusts, two Shell Chemical insecticides have been used extensively—aldrin and dieldrin. These insecticides have proved successful in India, Pakistan, Iran, Iraq, and other countries. When swarms of locusts swept into Southern Morocco recently, supplies of aldrin and dieldrin were brought in by air for use in large-scale aerial and ground control operations. This kind of international collective action is encouraged by the Food and Agricultural Organization of the United Nations and other international organizations concerned with world food problems and locust control.

California Agricultural Forum

A discussion of the Miller Amendment . . . pesticide tolerances and what they mean to the agricultural industry—highlighted the Central California Agricultural Forum held December 15 at the Bakersfield Inn, Bakersfield, Calif. Participating in the discussion were: D. W. Dean, USDA, San Francisco; Allen; B. Lemmon, State of California, Sacramento; J. E. Sivoft, University of California, Berkeley; and L. C. Glover, Shell Chemical Corp., San Francisco.

Members and guests attending the one day meeting also discussed such subjects as the value of weed control in crop production and value of weed control in combatting insects. W. H. Harvey, University of California, outlined some new methods and materials in weed control.

The spotted alfalfa aphid has been a major problem in California in recent years, and Ray F. Smith, University of California, reported to his audience on the current situation, results of research work and what might be expected.

R. M. Barnes, Kern County Farm Advisor, gave a brief coverage of some of the major crops replacing cotton acreage.

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Soil Builders Award for Editors

George Johnson, Crops and Soils Editor of *Successful Farming*, Des Moines, Iowa, and Carl Deitmeyer, managing editor, *The Nebraska Farmer*, Lincoln, Nebr., received the Soil Builders Award for Editors, presented by the National Plant Food Institute, at the annual meeting of the American Agricultural Editors' Association in Chicago on November 30.

The Institute sponsors the award in a nation-wide contest conducted annually in cooperation with the Association. Louis H. Wilson, secretary and director of information of the Institute, made the presentation.

To Make Granular Fertilizer

F. S. Royster Guano Company, Baltimore, Md., is equipping a new department for production of granular fertilizer. The department is expected to be in operation early in 1956 to supply next spring's seasonal demands. The drying equipment being installed is natural gas-fired.

•

Insecticide Consumption Up

A report on farm costs issued at the 33rd annual Agriculture Outlook Conference held in Washington, D.C., late in November indicated that more pesticides were used by farmers in 1954-1955 than in the previous year . . . however, stocks on hand at the end of the season were somewhat higher than a year ago. It was indicated that part of the increase in consumption was due to the weather. More rainfall in the eastern cotton belt compared with the previous year increased insect infestation and also made more frequent dusting and spraying necessary to replace the insecticide washed off by rain.

It was reported, also, that while changes in prices since 1954 have been small, declines in prices of most pesticides in the last few years have been substantial. Manufacturers' prices of such insecticides as benzene hexachloride and DDT are only 1/3 and 3/5 as high, respectively, as they were in the fall of 1951.

Other insecticides, such as aldrin, calcium arsenate, lindane, and toxaphene are also lower. Prices of some pesticides, including nicotine, sulfate, copper sulfate, are somewhat higher than they were four years ago, but the trend in prices of most pesticides has been downward.

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Escambia Appoints Robertson

Dr. Nat C. Robertson of Wellesley, Mass., has been appointed director of research for Escambia Bay Chemical Co., whose multi-million dollar petrochemical plant at Pensacola, Fla., is nearing completion. It is scheduled to build a large polyvinylchloride plant in 1956, and later a vinyl and an acetylene plant.

Control your moisture problem with FULTON WPPL* bags

*Water Proof Paper Lined

—at a lower cost than rigid containers

By: T. R. Moorer, Sales Manager, Bag Division, Fulton Bag & Cotton Mills, Atlanta, Georgia

Protecting costly chemicals from moisture, whether in transit or in storage, is only part of the problem. An equally important factor is to do so at the lowest possible cost.

Old-fashioned methods required expensive, heavy, rigid containers to keep moisture in its place. This also added to transportation cost and required extra warehouse space. Fulton WPPL bags have provided the answer.

Today, more and more firms give their chemical products complete, low-cost protection with Fulton WPPL bags. These are made of economical burlap or cotton laminated to paper or polyethylene.† WPPL bags have effected tremendous savings in many industries and should be able to do the same for you.

†Fulton's polyethylene-lined waterproof bags are acid and alkaline resistant.

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Special Services Division, General Sales Office
FULTON BAG & COTTON MILLS
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We have a problem in packing _____

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(Please feel free to write Fulton full details in complete confidence)

Name _____

Company _____

Address _____

Please write ☐ Have a representative call ☐

Let Fulton help solve your packaging problem

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BAG & COTTON MILLS

ATLANTA • CHICAGO • DALLAS • DENVER • KANSAS CITY
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OKLAHOMA CITY • PHOENIX • ST. LOUIS • SAN FRANCISCO
SAVANNAH • WINTER HAVEN

Fertilizers Under French License

New chemical fertilizers will be mass-produced in the United States and Canada for the first time under advanced French processes licensed by Compagnie de Saint-Gobain of Paris, France, according to an announcement by Rene Grandgeorge, general manager.

A plant costing $22 million dollars will be completed at Medicine Hat, Alberta, next year to manufacture these fertilizers. They will be made under Saint-Gobain license, using a phosphoric acid process owned jointly by that firm and Union Chimique Belge, Brussels, Belgium.

The process involves manufacture of ammonium phosphates through the inter-action of phosphoric acid and anhydrous ammonia. Another type of ammonium phosphate is made by similar means with the addition of sulphuric acid, which raises the nitrogen content.

This new chemical fertilizer process will be used by Northwest Nitro-Chemicals, Ltd., controlled by Commercial Solvents Corp. Associated in this venture will be New British Dominion Oil Co., Ltd., Ford, Bacon & Davis, Inc., and Frank McMahon of Alberta.

•

Black Leaf Plant Manager

Wayne D. Wegrich is the new plant manager of The Des Moines (Iowa) pesticide processing plant of Diamond Black Leaf. The Des Moines plant was built and put into operation in January, 1955, by the Geigy Agricultural Chemicals Division of Geigy Chemical Corp., New York. Diamond Black Leaf Company took over the operation of this plant Dec. 1.

Prior to his present appointment, Wegrich served as manager of the Diamond Black Leaf plant at Waco, Texas, for the past seven months. He joined the Diamond organization in May, coming from Minnesota Mining and Manufacturing Company, where he had been a sales engineer. Previously, he was associated in various supervisory capacities with the Virginia-Carolina Chemical Corporation for two years at its Waco and Richmond plants.

Ins. Pkg. Wins Aerosol Award

Grand award winner in the fourth annual aerosol packaging contest sponsored by the Chemical Specialties Manufacturers' Association was a floral insecticide marketed by Sears, Roebuck & Co. Joseph Cain (right), Brooklyn store manager for Sears, accepted a plaque award on behalf of his company from Fred G. Lodes (left), Precision Valve Corp., Yonkers, N. Y., chairman of the trade association's aerosol awards committee, at the 42nd annual meeting of the C.S.M.A. held at the Hotel Roosevelt, December 5-7.

•

R & H Buys Chicago Site

Four and one-half acres in Niles, Illinois, near the Chicago city limits, have been purchased by Rohm & Haas Co., Philadelphia as a site for a warehouse and office building expected to be ready for occupancy before the end of next year.

A part of the firm's early history centers in the Chicago area. Beginning in 1914 and for several years thereafter a small manufacturing operation was conducted there. Since then the company has maintained a branch sales office and stocks of certain products in rented quarters. Now it is planned to integrate operations in a single modern building soon to be constructed. Products to be warehoused include agricultural and sanitary chemicals, leather chemicals, etc.

•

Massaglia Joins Atlas

Edward J. Massaglia has joined Atlas Powder Co., Wilmington, as assistant general manager of the chemicals division. Mr. Massaglia formerly was vice president and director of Pfizer International, Inc., serving with that organization from 1951 to 1955. Prior to that, he was engaged in development and manufacturing work for Chas. Pfizer & Co., Inc.

Pacific Coast Appointments

Pacific Coast Borax Co., has announced that effective immediately the following personnel changes would be made in their agricultural sales division:

Mr. F. T. Winters, Jr., has been appointed special advisor on herbicide sales to the parent company, Borax Consolidated, Limited in London. In his new position, Mr. Winters will be studying the potential markets for the company's herbicides in various markets throughout the world.

Dr. L. M. Stahler has been appointed manager of the agricultural sales division, and henceforth will direct the activities of that sales organization throughout the United States. His headquarters will continue to be in Los Angeles.

Mr. Dale Rake has been appointed director of agricultural research and development, which position was formerly held by Dr. L. M. Stahler. He will be responsible for research and development work, particularly on the Company's herbicide products, and will also be headquartered in Los Angeles.

•

Raymond-Albemarle Merge

The Raymond Bag Co., Middletown, Ohio, has operated as a wholly owned subsidiary of the Albemarle Paper Manufacturing Co., Richmond, Va., since November 28th. Raymond, manufacturers of multiwall paper shipping sacks, will retain its identity and the present personnel will remain intact.

According to W. F. Lawrence, board chairman, and C. L. Mers, president of Raymond, the purpose of this change was to make Raymond a part of an integrated operation. Albemarle has its own pulp and paper mills, producing kraft paper and other specialty papers used by Raymond in the manufacture of multiwall paper shipping sacks. The combination of the two companies will assure Raymond of adequate supplies of all papers required in their production. Multiwall paper shipping sack producing facilities will continue to operate in both the Richmond and Middletown plants.

All crops need nitrogen. When they do . . .

SELL HORSE & LION NITROGEN FERTILIZERS

ALL HORSE & LION nitrogen fertilizers are easy to spread—because they're granulated for that particular purpose. So they are easy to handle, and easy to apply. If you want to sell the **best**, at competitive price, **offer "Horse & Lion" nitrogen fertilizers**—five different types and concentrations for various requirements:

HORSE & LION Calcium Nitrate: 15½% pure nitrogen, combined with about 28% available lime. Granulated.

HORSE & LION Calcium Ammonium Nitrate: 20½% pure nitrogen (10¼% nitric and 10¼% ammonic nitrogen) and approximately 33% calcium carbonate. Granulated.

HORSE & LION Ammonium Sulphate Nitrate: 26% pure nitrogen (11% nitric and 15% ammonic nitrogen). Granulated.

HORSE & LION Urea 44: 44% pure nitrogen. Coated pellets for dry use.

HORSE & LION Urea 46: 46% pure nitrogen. Pellets without coating for liquid application or dry use where fast dissolving desired.

For complete information and prices, contact your nearest "HORSE & LION" fertilizer headquarters.

ATKINS, KROLL & CO.

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EXCLUSIVE DISTRIBUTORS, U. S. A.

500 Fifth Avenue, New York 36, New York
417 Montgomery Street, San Francisco 4, California
417 South Hill Street, Los Angeles 13, California
421 S.W. Sixth Avenue, Portland 4, Oregon

Flag Sulphur Appointments

Flag Sulphur and Chemical Co., Tampa, Fla., advise that Raymond H. Cooney is sales manager, beginning January 1st, succeeding Marion Nabors who has transferred to another Flag Sulphur division. Michael R. Muskin is the new operations manager.

•

Naugatuck Adds to Staff

Naugatuck Chemical Division, US Rubber Co., Naugatuck, Conn., recently added a technical representative and three field development representatives to the agricultural chemical staff. F. Byrd has been transferred to the technical sales staff, while P. W. Bohne, J. P. Corkins and B. S. Morgan have joined the development department.

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New Col-Southern Sales VP

C. F. Bingham became vice-president in charge of sales of the Columbia-Southern Chemical Corp. He succeeds W. I. Galliher, vice-president and director, who retired December 31st.

Effective January 1st, H. W. Gleichert becomes vice-president in charge of market research and development, W. F. Newton becomes director of sales, and P. A. Fodor, Jr., becomes assistant director of sales.

•

Popham Succeeds Hoyt at USDA

Appointment of Dr. W. L. Popham as director of crops regulatory programs for the Agricultural Research Service of the USDA, was announced as being effective Jan. 1. Dr. Popham, who has been in charge of the USDA's plant pest control work since 1941, succeeds Dr. Avery S. Hoyt, who retired December 31st, after 25 years of service in the department as a top administrator of entomological research and plant pest control activities.

Dr. Hoyt had directed crops regulatory programs for the USDA since 1953.

•

Hall is Mathieson W. Mgr.

J. Newton Hall has been named western manager of the insecticide division of Olin Mathieson Chemical Corp. The announcement was made by Robert Zipse, general manager. Mr. Hall's headquarters will be in Denver. Mr. Hall is a former sales vice-president of Julius Hyman & Co. of Denver, and from 1952 until he joined Olin Mathieson he was a vice president of Pioneer Chemical Associates, Inc. of Denver.

•

Chilean Nitrate Appoints

Chilean Nitrate Sales Corp., New York, on December 30th announced the appointment of H. S. Gordon, Jr., as district manager of the Jackson, Miss. office. He succeeds W. H. Milam, who retired recently, but will continue as consultant. Mr. Gordon was formerly in the Montgomery, Ala., office of Chilean Nitrate.

•

New Huber Division

J. H. Huber Corp. has formed a new sales division to serve the pesticide and other industries, called the General Industries Division. Ralph R. Browning, Jr., was named manager of the new division.

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IMCC Appointments

C. B. Brisenden has been appointed to the marketing staff of International Minerals & Chemical Corp.'s Plant Food Division as advertising and promotion supervisor.

The Phosphate Division of IMCC named R. B. Fuller as a special consultant, with headquarters at Mulberry, Fla. Mr. Fuller was previously manager of the corporation's Florida Phosphate Department.

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Murphy of Am. Potash Dies

William J. Murphy, vice president and director of American Potash and Chemical Corp., New York, died in mid-December of a heart attack. He was 60 years old. Mr. Murphy joined American Potash Corp. as an office boy at the age of 16. He rose through various posts in the company and in 1941 was made a vice president. He was a director of the American Potash Institute, The American Potash Export Assn. and the National Plant-Food Institute.

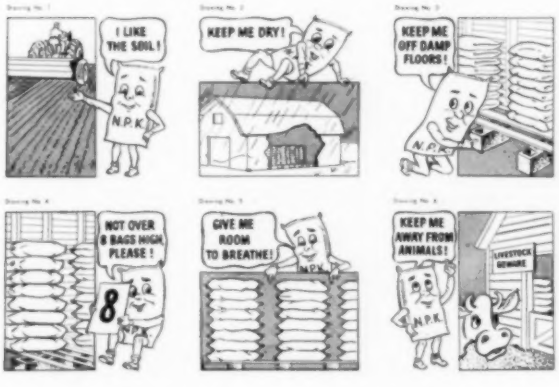
•

Milwaukee Claim Upheld

A settlement of the trademark litigation between the Sewerage Commission of the City of Milwaukee, manufacturers of "Milorganite," and Summers Fertilizer Co., et al., distributors of "Pittorganite" has been resolved in favor of the city of Milwaukee in the United States District Court for the Western District of Pennsylvania.

As a result of a decree entered in the above court, Summers Fertilizer Co., Kelly Agricultural Products Co., Philip P. Rosette, Marcellus Hoover and Versharens, a large retailer in the Pittsburgh area, have been perpetually enjoined from selling or marketing a fertilizer product under the name "Pittorganite" or "Kapoganic—formerly called Pittorganite" on the grounds that the name "Pittorganite" is an infringement on the tradename "Milorganite." Also as part of the judgment the Summers Fertilizer Company agreed to pay damages.

How to Store Fertilizer on Your Farm



NPFI Aid to Farmers

The National Plant Food Institute, Washington, D. C., offers a series of cartoons directed toward educating the farmer in how to store fertilizer on his farm. The drawings are 8 x 10 on glossy paper and feature important points to be remembered in the course of storing fertilizer.

New Chase Managers

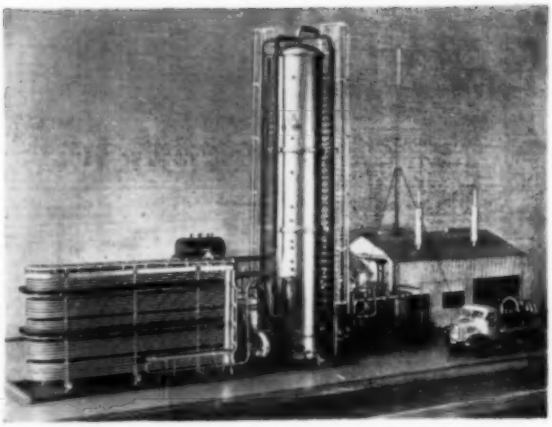
New managerial appointments in the Chase Bag Co., Chicago, were announced recently.

B. G. Deazley, formerly with the firm's Philadelphia branch, has assumed the position of manager of the Chase Bag manufacturing plant in Reidsville, N. C. The facility produces a large volume of textile bags. Mr. Deazley joined Chase Bag Company in Buffalo in 1945. He succeeds J. A. White, Jr., sales manager for Chase Bag in the Richmond territory.

A. Chad Ogden, with Chase since 1940, has been named sales manager of the firm's branch in Kansas City. He formerly served in the Dallas territory, where he has been sales manager for several years.

G. E. Snoke, assistant manager of the Chase Bag manufacturing plant in Goshen, Indiana, succeeded the late J. Dana Cramer as manager on October 12.

Nitric Phosphate Plant Model



Scale model of a 20 ton/day nitric acid plant exhibited at the recent chemical exposition in Phila., by Chemical & Industrial Corp., Cinc.

C & I designed and constructed plants similar to the model, which are in operation at Brea Chemicals, Brea, Calif.; Mississippi Chemical Corp., Yazoo City, Miss. and USI, Tuscola, Ill.

Clark Appoints Distributors

Clark Equipment Co., Benton Harbor, Mich., appointed J. W. Burress of Winston-Salem, N. C. as North Carolina distributor for the Michigan line of tractor shovels and excavator cranes. Sheehan Bartline, Inc., Sioux Falls, is the new distributor for South Dakota.

More Weevils in Hibernation

Reports from Louisiana and South Carolina by U. S. Department of Agriculture and state entomologists indicate more live boll weevils entered hibernation this fall than for several years past.

The annual fall check-up has been carried on in Madison Parish, La., for 19 years and in Florence County, S. C. for 13 years. Reports of similar surveys in other cotton states will be made to the Department during the next few weeks.

As in the past, these surveys will be widely depended upon by cotton growers, State and Federal entomologists, industry, and insecticide processors and dealers as a clue to the likely boll-weevil situation next year. However, the entomologists point out, weather conditions this winter will greatly affect the numbers of weevils that enter cotton fields early next Summer. Surveys will be made again in the Spring to determine how many weevils survive hibernation.

Boll weevils in both counties examined numbered five times the average found a year ago, and more than twice that of the previous high.

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Kraft Advances Finley

P. F. Finley, formerly in charge of the Baltimore sales office for Bemis Bros., has been appointed assistant sales manager for the Kraft Bag Corp. in charge of multiwall bag sales in the Southeastern territory.

P. E. Bray, has joined Kraft Bag Corp. to function as field engineer for the company's automatic bag filling machine—the Kraftpacker.

Helgeson Elected President at N. C. Weed Conference in Omaha

THE 12th annual North Central Weed Control Conference was held December 5-7 at the Fontenelle Hotel, Omaha, Neb. More than 700 members and guests registered at the meeting, and elected E. A. Helgeson, North Dakota Agricultural College, as president for 1956, to succeed Buford H. Grigsby. Other new officers are vice president F. W. Slife, University of Illinois; and secreatry-treasurer, D. W. Lambert, Nebraska Department of Agriculture. It was announced that the 1956 meeting of the conference will be held December 10-12, 1956 at the Hotel Sherman, Chicago. O. C. Lee and G. F. Warren, both of Purdue University, are co-chairman on local arrangements.

Featured at the Omaha meeting was a review of the "Implications of the Miller Amendment in Reference to Weed Control Chemicals," presented by Samuel Alfend, Kansas City District Food & Drug Administration. In a further analysis of regulation, V. Woestemeyer, Topeka, Kans., discussed state weed laws in action.

During a review of engineering developments, D. T. Plack, USDA, Toledo, Ohio, outlined the effect of pesticides on spray equipment. Other discussions featured at the three-day meeting concerned weed control in field crops, perennials, horticultural crops, woody plants, etc.

A special program for farmers was held on December 8th, including industrial exhibits. Discussions directed to the farmer on weed control offered practical solutions to the farmers' weed problems. A report on weed killing chemicals for modern farming by E. P. Sylwester, Iowa State College, was particularly interesting.

An honorary membership was presented to Dr. Charles J. Willard of Ohio State University in honor of his many accomplishments in weed control work. Most recently, Dr. Willard was awarded the Distinguished Service Award for Agriculture for 1955 by the National Honorary Agricultural Fraternity, Gamma Sigma Delta.

Two county workers honored at the NCWCC for outstanding work in the field of weed control during the past season were T. H. Young, Spearfish, S. D., and Henry W. Bless, Wells, Minn.

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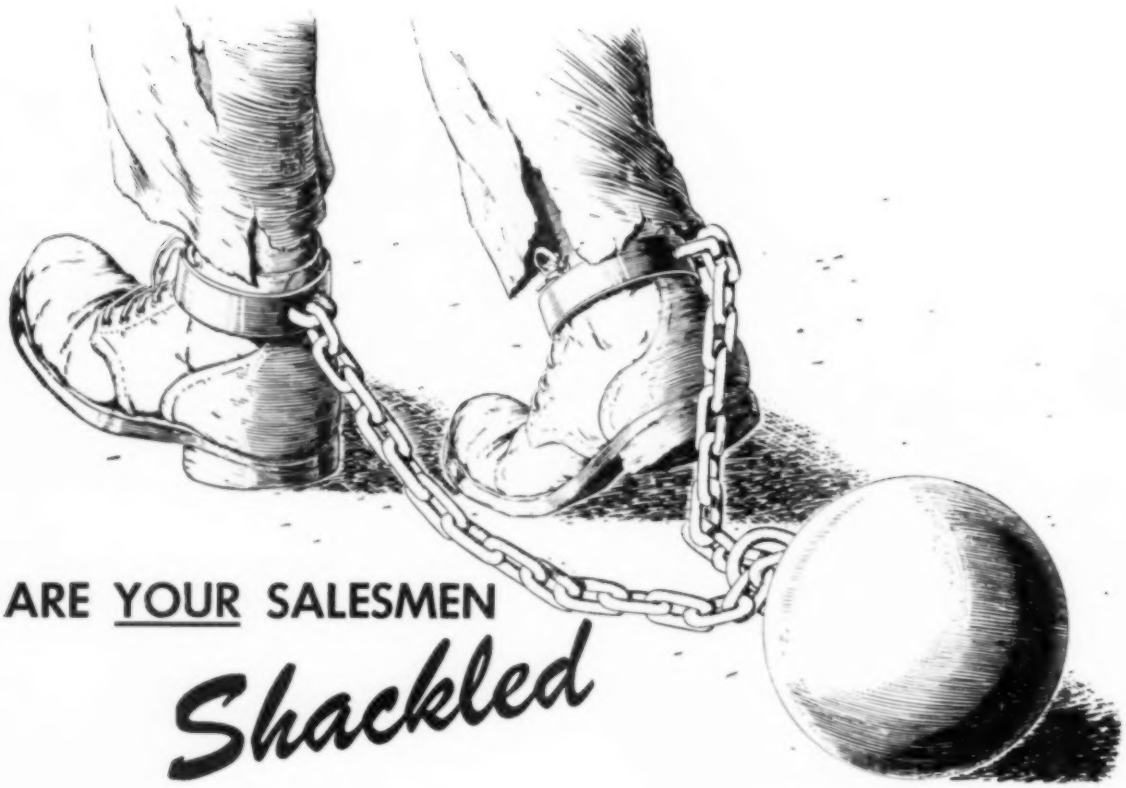

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New Cyanamid Po_3 Plant

American Cyanamid Co., New York, plans to build a 200,000 ton per year triple superphosphate plant at Brewster, Fla., on an existing Cyanamid site where phosphate rock is mined.

Construction will begin immediately and is expected to be completed about mid-1957. Chemical Construction Corp., a Cyanamid unit, will design and construct the plant in collaboration with Dorr-Oliver, Inc.

•

New Naugatuck Personnel

A new technical representative and three field development representatives have been added to the agricultural chemical staff of the Naugatuck Chemical division, United States Rubber Co., New York. Felton Byrd, formerly a field development representative, has been transferred to the technical sales staff. Paul W. Bohne, J. P. Corkins and B. S. Morgan have joined the development department.

•

New Ohio Fertilizer Plant

The Ohio Equity Exchange Co., Lima, Ohio is building a fertilizer manufacturing plant at Crestline, Ohio. The plant will have a storage capacity of 5,000 tons. Bagging and shipping will be in a separate building along with storage space for bagged product.

Construction was started the early part of December. The plant is being designed by D. M. Weatherly Co., Atlanta.

•

Agri Serv To Market Ortho NH_3

California Spray-Chemical Corp. and Agricultural Ammonia Service, Inc., announced jointly a new marketing agreement, whereby Agri-Serv becomes the sole authorized distributor of Ortho NH_3 throughout the San Joaquin Valley and the coastal counties of Los Angeles, Ventura, and Santa Barbara. This move integrates two well known leaders of the agricultural supply and service industries in California.

Ammonia will be produced at Calspray's $16,000,000 fertilizer plant at Richmond, California. The capacity of Agri-Serv's storage, distribution and application facilities throughout California will be more than doubled to provide the best grower service possible.

•

Fulton Assistant Mgr.

Peter H. Walmsley is the new assistant manager at the New Orleans branch of Fulton Bag & Cotton Mills. Mr. Walmsley joined the company over six years ago. His first duties were in connection with plant manufacturing operations and he later traveled several southern states as sales representative. Following this, he was chosen to head several of the branch's bag departments and more recently became administrative assistant in the company's general sales office.

•

PCA-Duval In Patent Case

A patent infringement suit against Duval Sulphur & Potash Co. has been decided in favor of the Potash Co. of America. Federal Judge W. Rogers ruled that use of Potash Co.'s patented flotation process was worth 10¢/ton of finished products, and Duval has been ordered to pay some $46,000 for use of the process from Nov. '51 to July '53, when patent rights expired.

•

V-C Opens New Sales Ofc

Virginia-Carolina Chemical Corp. was scheduled to open a new fertilizer sales office at Rochester, N. Y., on January 1. In addition, V-C is enlarging its Rochester production facilities. E. Earle Lacy will head the new sales office, and Hugh M. Griffith is the factory superintendent.

Kolker Producing Me Br

Kolker Chemical Corp., has started full-scale production of methyl bromide at its plant in Newark, N. J. Methyl bromide is recommended as a fumigant for the elimination of insect and rodent infestation of grain, tobacco plant beds, seeds, dried fruits, cereals, nursery stock and a wide variety of other products.

Kolker methyl bromide is packed in regular one-pound cans with 2 percent chloropicrin as warning agent, and 125, 150 and 450 pound cylinders of 100% methyl bromide. Its sale will be handled by distributors throughout the country.

•

Coops Buy More Fertilizer

Midwest co-ops nearly doubled their fertilizer buying through Consumers Cooperative Association in the year ending August 31, according to H. A. Cowdern, president of the Association. This, he said, brought sales to about $90 million. The report included figures for Cooperative Farm Chemicals Association.

•

Albermarle Buys Raymond

Albermarle Paper Manufacturing Co., Richmond, Va., will purchase the Raymond Bag Co., Middletown, Ohio. Original plans for the purchase were announced in mid-November and were later approved by Raymond stockholders.

Raymond Bag has a capacity of 30,000 tons of kraft paper a year. Albemarle operates three mills in Richmond, Va., and another in Roanoke Rapids, N. C.

Western Ohio Regional Lime and Fertilizer Conference

Attending the Western Ohio Regional Lime and Fertilizer Conference, from left to right: John Slipher, Ohio State University, Columbus, O. Malcolm H. McVickar, National Plant Food Institute, Washington, D. C.; E. P. Reed, Ohio State University; R. R. Davis, Ohio Agricultural Experiment Station; and George Enfield, U. S. Department of Agriculture, Washington, D. C.

Dr. McVickar, NPFI's Chief of Agronomic Education in discussing "New Developments in Fertilizer" said: "The fertilizer industry now represents one of the largest segments of the chemical industry. Through mechanization and improved technology, the industry gives the farmer more for his money year after year."

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Calls-Champion Merge

Call's Nurseries, Perry, Ohio, has merged with the Champion Nurseries, also of Perry. Call's Nurseries had been in continuous operation since its establishment in 1877. They have been growers of a complete line of nursery stock, featuring shade trees, ornamental shrubs and evergreens.

Champion Nurseries, owned and operated by the Champion brothers, will operate the Call's Nurseries along with their present business.

•

2nd Spencer FR Seminar

Bankers from six states met in Kansas City in mid-November to discuss the work of the bank farm representative. The occasion was the second bank farm representative seminar conducted by Spencer Chemical Co.

The group heard Raymond J. Doll, agricultural economist for the Federal Reserve Bank of Kansas City, outline the present and future trends in the agricultural economy. They visited Spencer's Jayhawk Works near Pittsburg, Kan., and saw how ammonium nitrate fertilizer is made.

Feature of the seminar was a day-long panel discussion at which the representatives discussed and gave answers to five questions concerning their work. The questions were: "What evidence do you have that your work with farmers has led to better farming practices and more profitable farming operations in your area?" "Is it necessary that an FR have lending authority?" "What can an FR do to help tailor credit to the individual needs of the farmer?" "To what extent should an FR make fertilizer recommendations on the farm?" and "How can an FR help provide for intermediate term credit needs of farmers?"

•

FMC Adds to Development Staff

The following were recently appointed to the staff of the (new) Central Development Department of the Chemical Divisions, Food Machinery and Chemical Corp., N. Y.

Dr. Lloyd G. Mount, who has been in charge of market research at Chemstrand, and was formerly with American Cyanamid; Dr. Julius B. Olin, from the University of Washington; Jerry J. Sherwood, who was associated with the development department of Jefferson Chemical, and was formerly with American Cyanamid and West Virginia Pulp and Paper Co.; and Richard M. McFarland, who was with the market development department of Brea Chemicals, and formerly with DuPont.

New Dow Distributor in S.D.

The Sexauer Co., Brookings, S. D., whose operations include North Dakota, South Dakota, Minnesota, Iowa and Nebraska, will sell the Dow line of agricultural chemicals, according to an announcement issued jointly by the Dow Chemical Co., Midland, Mich., and the Sexauer firm. North Dakota sales will be handled by the New Day Seedsman division of the firm. Sexauer's principal business is in grain, seeds, and agricultural chemicals.

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APS Hold 47th Meeting at Atlanta, December 27-30

SOME 500 members and guests were expected at the forty seventh annual meeting of the American Phytopathological Society held December 27-30 in conjunction with the American Association for the Advancement of Science and the Southern Division APS. The meeting was held at the Atlanta Biltmore Hotel, Atlanta, Ga.

Sectional metings on the following topics were included in the program:

The Tobacco Plant
The Cotton Plant
Fungicide Colloquium
Virus Diseases
Diseases of Cereal Crops
Diseases of Ornamentals and Forest Trees
Plant Pathologists Can Use TV
Present Status and Outlook for Antbiotics and Chemotherapeutants in Controlling Plant Disease
Nematology
Fungicidal Control of Plant Diseases
Diseases of Field Crops
Diseases of Vegetable Crops
Disease Resistance
Nematode Diseases
Antibiotics and Seed Treatments
Smut Diseases of Cereals and Grasses
Diseases of Fruit Crops
Physiology of Diseased Plants
Diseases of Forage Crops
Genetics of the Fungi
Nature of Fungicidal Action

Some of the specific reports given at these sessions are listed below:

"Status of Fungicides in Relation to the Miller Bill," Winton B. Rankin, Food and Drug Administration.

"Systemic Fungicides," Harry C. Young, Ohio Agricultural Experiment Station.

"Nematode Control," J. N. Sasser, N. C. State College.

"Industry's Part in Meeting New Fungicide Needs," G. A. Brandes, Rohm & Haas Co.

"Reports by Industry Representatives on New Fungicides."

"Current Objectives and Progress by Industry." Representatives of antibiotic manufacturers.

"New Materials as Eradicant Fungicides," E. E. Wilson, and J. M. Ogawa, Univ. of California.

"Plant Disease Control by a New Class of Chemicals, 2-Pyridinethiol I-Oxide and Derivatives," Patricia Allison and G. L. Barnes, Ohio State University, and John Powell Laboratories.

"Modifications in Soils of Southern Pine Nurseries, Produced by Fungicidal and Nematocidal Chemicals," A. A. Foster, E. F. Cairns, and Bruce Hopper, U. S. Dept. of Agriculture.

"Effectiveness of Ethylene Dibromide, D-D, and Nemagon in Controlling the Sting Nematode on Sandy Soils in South Carolina." Q. L. Holdeman, South Carolina Experiment Station.

"Vapor Action of Some Seed Treatment Fungicides Used for Wheat Smut Control," Laurence H. Purdy, Washington State College and U. S. Dept. of Agriculture.

•

Use 1.52% Less Fertilizer

Farmers in the United States during the 1954-55 crop year used an estimated 20,518,180 tons of fertilizers, a decrease of 1.52 per cent below the 1953-54 tonnage, reports the National Plant Food Institute, Washington, D. C. Notwithstanding the reduction of 316,754 tons, the total tonnage of all fertilizers used is the third largest on record.

A new record in terms of plant nutrients is indicated on the basis of reports received from state fertilizer control officials and industry sources, which the Institute attributes to higher plant food content of fertilizer. The 1953-54 consumption on a plant nutrient basis, as reported by the U. S. Department of Agriculture, was 5,778,510 tons.

Institute agronomists point out that "the consumption pattern in the Middle West, which has shown a steady increase in recent years, appears to have leveled off in 1954-55" and that the "only significant increases this year were registered by the New England and Western regions."

"The increase of 7.8 per cent in New England is particularly notable because consumption has been steadily decreasing in that area in recent years," they stated. "The South Central region, which includes a major portion of the country's cotton acreage, showed the largest decrease. Smaller decreases were registered in the Middle Atlantic and East North Central regions. Generally, it is believed that drought, depressed farm commodity prices, and crop controls were among the principal causes for the decline."

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INDUSTRY MEETING CALENDAR

Jan. 4-6—Weed Society of America. Hotel New Yorker, New York City.

Jan. 10-11—North Carolina School, North Carolina State College, Raleigh, N. C.

Jan. 11-12—Wisconsin Insect Control Conference with Industry, Lorraine Hotel, Madison, Wisc.

Jan. 15-18 Conference of California Mosquito Control Association, Elks Club, Marysville, Calif.

Jan. 16-17—Annual Arborists School, New York State Arborists Association and State University of New York, Hotel Onondaga, Syracuse, N. Y.

Jan. 16-18 Southern Weed Conference, Hotel Jung, New Orleans.

Jan. 16-18 — N. W. Vegetable Insect Control Conf., Imperial Hotel, Portland, Ore.

Jan. 18-20 — Western Cooperative Spray Project, Imperial Hotel, Portland, Ore.

Jan. 19-20 Northeastern Mosquito Control Association, Waltham, Mass.

Jan. 19-21—National Canners Association, Atlantic City, N. J.

Jan. 24-26 — Midwestern Garden Supply Trade Show, International Exposition Hall, Chicago.

Jan. 25-26 — Ninth Naval District Pest Control Conference, Ninth Naval District, Great Lakes, Ill.

Jan. 26-27—Custom Spray Operators' Training School, University of Illinois, Illini Union Ballroom, Urbana, Ill.

Jan. 27 — Colorado Agricultural Chemicals Association, joint meeting with Colorado A & M College, Cosmopolitan Hotel, Denver, Colo.

Jan. 30-Feb. 3—Pest Control Operators Conference, Purdue University, Lafayette, Ind.

Feb. 6-8 — Cotton States Branch of the ESA and Southern Agricultural Workers, Biltmore Hotel, Atlanta.

Feb. 7-9 — N. Y. Garden Supply Trade Show, Kingsbridge Armory, New York City.

Feb. 15-17—California Weed Control Conf., Sacramento & Davis, California.

Feb. 16-17—Annual joint meeting of midwestern college agronomists and fertilizer industry representatives, Edgewater Beach Hotel, Chicago.

Feb. 20-21 Southwestern Branch, Entomological Society of America, Hotel Texas, Ft. Worth, Texas.

Feb. 22-24 Alabama Plant Pest Control Conference, Alabama Polytechnic Institute, Auburn, Alabama.

Feb. 22-24 Midwestern Chapter of the National Shade Tree Conference, La Salle Hotel, Chicago, Illinois.

Feb. 22-25 Ohio Agricultural Aviation Conference, Ohio State University Columbus, Ohio.

March 14-18 National Agricultural Chemicals Assn. Hollywood Beach Hotel, Hollywood, Fla.

March 28-30—North Central States Branch of ESA, Purdue Memorial Union, Lafayette, Ind.

April 11-12 7th Insect & Rodent Short Course for Sanitarians, Purdue University, Lafayette, Indiana.

June 10-13 National Plant Food Institute, The Greenbrier, White Sulphur Springs, West Virginia.

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N. W. Agricultural Chemicals Industry Conference Jan. 18-20

THE Third Annual Pacific Northwest Agricultural Chemical Industry Conference, sponsored by the Western Agricultural Chemicals Associations, will meet at Portland, Oregon, January 18-19-20, when industry representatives from western United States and Canada gather for a series of meetings on control of vegetable and tree fruit pests and current industry developments.

Open meetings of the Pacific Northwest Vegetable Insect Conference are slated for the morning of January 18th at the Imperial Hotel, where reports on current seasons' research findings will be presented by section chairmen. Industry conference sessions start after lunch at the Benson Hotel, according to conference chairman Ed Turner, California Spray Chemical Co., Portland. A panel discussion on the Miller Amendment and its various ramifications will highlight the afternoon session. Participating panel members will include representatives from state research institutions, processors of raw agricultural commodities, the Food and Drug Administration, Pesticide Branch USDA, and the agricultural chemical industry. Mr. C. O. Barnard, executive secretary, Western Agricultural Chemicals Assn., will act as moderator.

Industry sessions January 19th will include a panel on Symphylids; "Weed Control Developments" by J. R. McCambridge, Chipman Chemical Co.; "Pesticide Safety," by C. O. Barnard, executive secretary, WACA; "Legislation Affecting the Pesticide Industry in the Northwest," by Keith Sime, Chipman Chemical Co.; "Insect Resistance," by Dr. P. O. Ritcher, entomologist, Oregon State College; and "Fungicides and Fungicide Testing" by Dr. Roy A. Young, plant pathologist, Oregon State College.

The January 20th meetings at the Imperial Hotel will feature reports of findings of the Northwest Cooperative Spray Project. A summary of 1955 research results on tree fruit insect pests and diseases will be presented by section leaders chosen from state and federal research agencies.

•

CMRA Meeting Jan. 31

The Chemical Market Research Association will hold a two-day meeting at Webster Hall, Pittsburgh, Pa., on January 31-February 1. Discussions will center on the theme of aromatic chemicals. H. F. Pfann, Pittsburgh Coke & Chemical Co., will be general chairman. Fred C. Foy, Koppers Co., will be guest speaker at a banquet February 1.

•

'55 Sulfur Production Up

Production of sulfur in the U.S. increased to an estimated 6,900,000 long tons in 1955, or 250,000 tons more than in 1954, while domestic consumption plus exports rose 400,000 tons to an estimated 7,100,000 tons.

Most of the new production came from the salt dome deposits of Louisiana and Texas mined by the Frasch hot water process. These mines—the major source of U. S. sulphur—produced an estimated 5,700,000 tons compared with 5,515,000 tons in 1954. Of the balance of the supply, 390,000 tons represented sulphur recovered from gases, 400,000 tons sulphur contained in pyrites, and 410,000 tons sulphur in various forms from other sources.

•

CFA Board Members

Board Members of the California Fertilizer Association at the 32nd Annual meeting, November 6-8, 1955 at the Hotel Mark Hopkins, San Francisco: Front row: secretary, Howard H. Hawkins, Glendora; vice president, Jack Baker, Los Angeles; president, Wm. E. Snyder, Los Angeles; treasurer, Wm. G. Hewitt, Berkeley; executive secretary and manager, Sidney H. Bierly, San Marino. Standing: directors Fred R. Bryant, Shafter; B. H. Jones, Fresno; N. M. Stockman, San Francisco; and V. A. Frizzell, Salinas.

Velsicol Names New Sales Rep.

James Wirwille has joined the Velsicol Chemical Corp., agricultural chemicals sales staff to represent the company in the East-Central states and Eastern Ontario. Mr. Wirwille was formerly with the Pennsylvania Salt Manufacturing Co. where he served as technical sales representative for the agricultural chemicals division. Prior to that he was on the staff of the United States Department of Agriculture.

•

Cuban Fertilizer Market

J. E. O'Neill, Office of the Commercial Secretary, Havana, reports that in 1953-54, Cuba imported some 138,000 short tons of fertilizer. The United States is the sole source of supply of all active materials used in the Cuban fertilizer industry, and of most of the mixed fertilizers.

Mixed fertilizers and all active materials for use in the local industry are exempt from customs duties.

Cuba imports only a limited amount of mixed fertilizer, but depends on foreign sources of supply for all materials used by the local industry in preparing fertilizers. There are some 16 fertilizer plants scattered throughout the island. One has facilities for treating rock phosphates, but all the others are equipped solely to turn out the various formulas used in Cuban cultivation. The largest fertilizer plants are in Havana.

Cubans prefer high phosphate fertilizers, because much of the soil under cultivation, particularly in the rice zones, is deficient in phosphorus. Extension of rice cultivation, which is still far below the country's needs, offers the greatest possibility for expansion of the fertilizer market.

Coops Sell More Mixed Fertilizer

During the fall roundup in Chicago of farm service organizations affiliated with the statewide Illinois Agricultural Association Dr. M. B. Russell, head of the agronomy department of the Illinois College of Agriculture at Urbana, briefed the farmers on developments in plant growth regulators, systemic insecticides and other recent scientific advances and drew attention to possible effects these will have on their business.

G. H. Becker advised the Illinois farmers' cooperative that many of the locals which entered the bulk blending field, have at the same time increased their sales of mixed and starter fertilizers. This, he said, seems to bear out the need for starter fertilizers in addition to basic and maintenance requirements. "Experience is teaching us," he asserted, "that starter fertilizers are most effective when used following a correct basic and maintenance program." Sales of plant food by Illinois Farm Supply Co. totaled $11,712,044 for the year, Mr. Becker stated. A shortage of production facilities forced the Illinois co-op to purchase large quantities of fertilizer from commercial sources. But, because of highly competitive conditions and high purchase and transportation costs, he said, practically all purchased material was distributed to members at a loss. Becker also told of paying out $355,300 in discounts to member locals under a "place-your-order-early" promotion.

•

Hercules Award to 4-H Club

The six National winners of $300 college scholarships in the National 4-H Entomology Awards Program were announced in Chicago, November 27th at the opening of the 34th National 4-H Club Congress. This is the fourth year of competition in the entomology awards program, sponsored by Hercules Powder Co.

The six scholarship winners are: Kay Fisher, Hollister, Calif.; Earl Wineinger, Norwich, Kan.; Joanne Cox, Elkton, Md.; Linda Bailey, Zebulon, N. C.; Ronald Cruea, Cedarville, Ohio; and Rita Kaye Brewer, Paoli, Okla.

In addition to winning scholarships the six National winners, and six other Sectional winners, received trips to the National 4-H Congress.

A buffet supper honoring the national and sectional winners was given by Hercules. Hercules officials present at the supper included Paul Mayfield, general manager, Naval Stores Department; M. R. Budd, director of advertising; and R. T. Yates, manager, Agricultural Chemicals Division, Naval Stores Department.

More than 1500 persons are attending the 34th National 4-H Club Congress, which was in session from November 27 to December 1. The delegates represent all 48 states, 3 territories, and 19 foreign countries.

M. G. WOODWARD was named traesurer and assistant secretary of Southern Nitrogen Co., Inc. The new company is constructing a $14,000,000 petro-chemicals plant in Savannah, Georgia, to start the production in early 1957 of 250 tons per day of nitrogen solutions for fertilizer use, and prilled ammonium nitrate.

AC

JAMES D. MERRILL has been appointed to the advertising staff of Velsicol Chemical Corp., Chicago. He will assist in planning and carrying out the various publicity, advertising and sales promotion programs.

AC

SHELL'S UREA PLANT at Ventura, Calif. is scheduled to be in production in October, 1956. The 100-ton/day plant is designed to use the Montecatini process.

AC

THUNDERBIRD CHEMICAL CO., holding a land option for a plant near Kyrene, Ariz., is expected soon to announce plans for construction of a urea plant.

AC

COLUMBIA RIVER CHEMICALS is reported to have abandoned plans for a 110 ton/day urea plant at Attalia, Wash., while Phillips Pacific Chemical Co. announced plans to go ahead with a 200 ton/day ammonia plant at Pasco, Wash.

LION OIL CO., a Division of Monsanto Chemical Co., was presented five safety awards last month in recognition of safety achievement, four at the El Dorado chemical plant and one to the general service department.

AC

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. announces the opening of a new warehouse in Detroit, Mich. at Jefferson Terminal, 1900 East Jefferson Ave.

AC

DEEP ROOT FERTILIZERS, INC., Olathe, Kansas, is a new fertilizer manufacturing company of which A. W. Bintner is president. The company will produce commercial pelletized fertilizer.

AC

DANIEL L. FITZPATRICK, SR., retired owner of the Jersey City Fertilizer Co., died recently at his home in South Orange, N. J. He was 84 years old.

AC

AMERICAN POTASH & CHEMICAL CORP. has announced the appointment of Paul E. McCoy to the company's sales development department at its New York office. Mr. McCoy was formerly with the Grace Chemical Co.

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THOMAS B. HOOKS, JR. of Houston has been named manager of sales training for the western fertilizer district of Olin Mathieson Chemical Corp., Little Rock, Ark.

AC

E. I. DU PONT & CO., recently appointed a new salesman for garden chemicals in the Chicago area. He is Henry C. Andersen, of New Castle, N. H.

AC

RUSSELL W. MUMFORD, vice president and consulting engineer for American Potash & Chemical Corp., Los Angeles, retired recently after 35 years service with the company.

AC

J. FORD WILSON was appointed director of production of the Fairfield Chemical Division of Food Machinery and Chemical Corp. last month. The production facilities of the division are located in the Fairfield industrial section of Baltimore.

AC

GYPSY MOTH CONTROL in the northeast, to prevent migration to southern and western states, was advocated at a meeting of the Eastern Regional Conference of the Council of State Governments and the NY Committee on Legislative Cooperation. Representatives of ten eastern states recommended that Congress appropriate $1,500,000 to fight spread of the pest.

AC

AMERICAN CYANAMID CO., New York, in its 1955 financial statement, shows a gross income of $455 million. Profits before taxes will be $72 million as compared with $51 million in 1954.

AC

AMERICAN POTASH & CHEMICAL CORP., Los Angeles, has acquired all of Western Electrochemical Co.'s common stock in exchange for 33,295 shares of its own class B stock. American Potash had previously owned 48.2 percent of Western Electrochemical common.

AC

THE OHIO EQUITY EXCHANGE CO., Lima, Ohio are considering plans to build a new fertilizer plant at Crestline, Ohio.

UNION SPECIAL MACHINE CO., Chicago, are celebrating the Diamond Jubilee Anniversary of the company's founding. The firm was started in 1881 in Chicago.

AC

VIRGINIA CAROLINA CHEMICAL CO., will start fertilizer manufacture at Rochester, N. Y. H. M. Griffith will be factory superintendent.

AC

THIMET . . . Formerly known as Insecticide 3911, is discussed in Bulletin NS15, just issued by the Georgia Agricultural Experiment Stations. The 22-page bulletin reviews results of field tests with 3911 for control of cotton insects in 1955.

AC

BEMIS BRO. BAG CO., St. Louis, Missouri, announcing organizational changes advise that J. Bemis, presently a vice-president and director, will become executive vice-president. T. H. Ashton becomes director of Central Operations and C. W. Akin becomes manager of the Omaha plant.

AC

CLARK EQUIPMENT CO., Buchanen, Mich., will form a new subsidiary to consolidate export functions. The new corporation will be known as Clark Equipment International, C. A., and is being organized under the laws of Venezuela.

AC

ROY E. JURY has just been appointed a vice president of Arkell and Smiths. He was formerly western division sales manager, in which capacity he will continue with offices in Kansas City.

AC

CHASE BAG CO., Chicago, have appointed J. A. Sutherlin as manager of export sales. He succeeds N. G. Kappler, who retired on Dec. 31.

AC

GEORGE H. RIPLEY, manager of the Sunflower Ordnance Works, Lawrence, Kans., has been transferred to the engineering department of the Hercules Powder Co., in Wilmington, Del. R. C. Tucker has been named manager of Sunflower. B. H. Sleight, Jr., will be assistant manager.

AC

RADIOACTIVE TRACER studies at the USDA are underway to determine how insects develop resistance to poisonous insecticides.

NATIONAL FARMERS UNION, Denver, plans three fertilizer plants in a major move to obtain a share of the fertilizer market in the far west. A $12 million, 125 tons/day anhydrous ammonia plant is planned for central Utah; a $5 million treble superphosphate and sulfuric acid plant will be built in northern Utah; and a mixed fertilizer pelletizing plant, may be put up in Salt Lake City.

AC

PETER C. CROLIUS has resigned his position as editorial assistant with the National Plant Food Institute, Washington, D.C., to become agricultural writer for the Nitrogen Division, Allied Chemical & Dye Corporation, New York City. His resignation became effective December 5.

AC

AMERICAN AGRICULTURAL CHEMICAL CO., New York, recently acquired a 16-acre site near London, Ontario, Canada, which will be the location of a new $125,000 fertilizer plant to be built soon.

AC

PERU FERTILIZER will be in production at a new plant next year. The company Fertilizantes Sinticos S.A. recently announced plans for the production of ammonium products in a plant to be financed by Montecatini of Milan, Italy, and a group of European financial interests.

AC

AMERICAN POTASH & CHEMICAL CORP., which owns 48.2 per cent of the common stock of Western Electrochemical Co., has offered to acquire the balance of its outstanding stock through the exchange of 33,295 shares of American Potash Class "B" stock.

AC

AGRICULTURAL CHEMICALS LTD., Ontario, Canada, announces its plans to construct a modern fertilizer factory at Hyde Park (London), Ontario. The new plant is expected to be in operation by July or August of 1956.

AC

NEW ANTIBIOTIC PRODUCTS to combat plant diseases were demonstrated to international agricultural scientists during a recent visit to the Squibb Institute for Medical Research, New Brunswick, N. J. Some 50 experts came from thirteen foreign countries as well as the United States to attend the first International Conference on the Use of Antibiotics in Agriculture held in Washington, D. C. under the auspices of the National Research Council.

AC

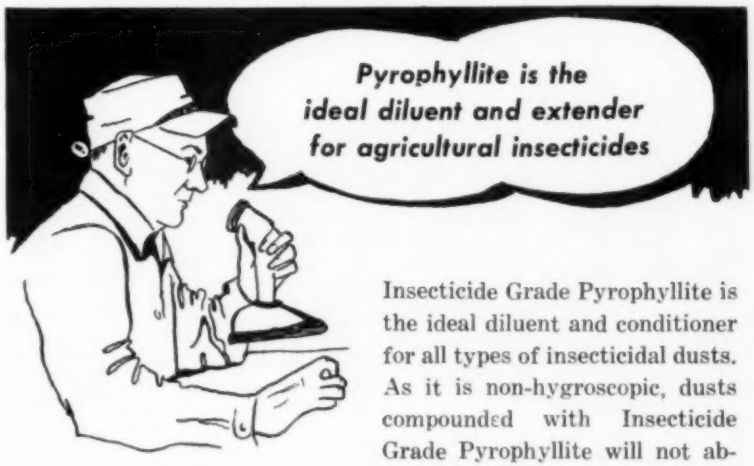
LOUIS C. SLATER, manager of the Textile Bag Division of Fulton Bag & Cotton Mills, New Orleans, resigned his post effective November 30th. Announcement was made by Fulton officials who expressed regret at Slater's departure and extended best wishes in his future activities.

AC

GENERAL CHEMICAL DIVISION, Allied Chemical & Dye Corp., New York, has just announced plans to expand sulfuric acid production facilities of their East St. Louis, Ill. works.

AC

ROBERT W. CAIRNS, assistant director of Hercules Powder Co.'s research department since 1945, has been appointed director of research.



Glendon's Insecticide Grade Pyrophyllite

Wt per cubic foot—30 lbs

92 to 95% will pass a 325 mesh screen

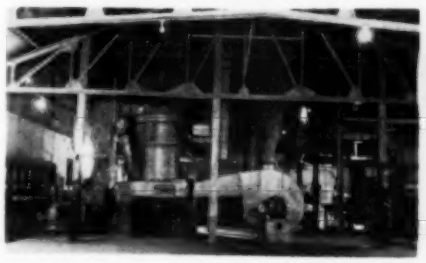
pH range of 6 to 7

Non-alkaline and chemically inert

Average particle size below 5 microns

Insecticide Grade Pyrophyllite is the ideal diluent and conditioner for all types of insecticidal dusts. As it is non-hygroscopic, dusts compounded with Insecticide Grade Pyrophyllite will not absorb moisture. Nor is there any tendency even during extended storage, for the carrier to separate from the active ingredients.

Insecticide Grade Pyrophyllite has superior adhering properties, and because it is difficult to wet, it holds well on the plant leaves even during rain. When used as a carrier for products to be dusted by airplane, it settles rapidly, minimizing drift, waste of materials, etc.



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Pyrophyllite Company

P. O. Box 2414

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Plant & Mines, Glendon, N. C.

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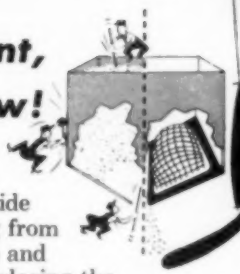
* Safety Quotient

How safe are your bins? Do you require an employee to endanger his safety and possibly his life by attempting to prod hung-up material from inside the bin. If so, you are creating a definite safety hazard.

Modern plant methods call for—

PneuBin Pulsating Panels

for safe, efficient, mechanical material flow!



PneuBin panels . . . mounted on the inside walls of your present bins and operating from your regular plant air supply . . . inflate and deflate in regulated cycles positively displacing the bin contents to free flow.

PneuBin decreases plant operating costs by reducing maintenance, insures constant material flow to production lines, eliminates accidents to personnel and increases other personnel's efficiency through its quiet operation.

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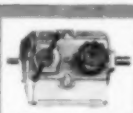

Variable Speed Hydraulic Transmissions

PneuBin— Pneumatic Bin Evacuators

E. C. WESTBROOK, after more than 40 years with the Univ. of Georgia, College of Agriculture, retired recently as agronomist for the Agricultural Extension Service. He will, however, continue his agricultural work as an employee of the Georgia Crop Improvement Association.

AC

JOHN O. J. SHELLENBERGER, vice-president, has been appointed director of marketing of American Chemical Paint Co., Ambler, Pa.

AC

R. L. HOCK has been appointed manager of American Cyanamid Co.'s Fortier Plant at New Orleans, La., J. I. Davidson has been appointed assistant plant manager.

AC

SIMS CHEMICAL PLANT, an Ohio cooperative, is expected to produce some 70,000 tons of granular fertilizer in 1956.

AC

GEORGE R. WILLIAMS has been named sales and service representative of Diamond Black Leaf Co., Cleveland. He was formerly with H. D. Hudson Manufacturing Co., producers of sprayers and application equipment.

AC

PAUL GREENING has announced his retirement as a distributor of Shell agricultural ammonia in a statement issued jointly by him and G. R. Monkhouse, vice president of Shell's Ammonia Division in San Francisco.

AC

NORMAN T. WHITTLE, district manager for the multi-wall division of the Hudson Pulp and Paper Corp. in the Texas-Louisiana territory, with headquarters at Houston, has been transferred to Atlanta in the same capacity for the Southeastern areas.

John W. Casey, who has just joined Hudson, will fill the Houston post.

AC

GRAHAM BARKER has been named industrial products technical representative for Emulsol Chemical Corp., a division of Witco Chemical Co., Chicago.

Equipment AND BULLETINS

New St. Regis Bag Process

Strength combined with lower cost, are provided by a new principle of multiwall bag construction according to a recent notice by St. Regis Paper Co., New York. Structural strips are used to reinforce the gusset areas and the edges of bags, where the greatest stress occurs.

The company advises that reinforcing the gusset areas is accomplished by placing structural strips of kraft paper between two walls of heavy duty multiwall bags. Thus far, this principle has been applied commercially only to multiwall bags of five and six ply construction. For a bag comparable to a five-ply bag, one structural strip is placed in each gusset of a four-ply bag, thereby reducing the amount of paper used in the package with no sacrifice of performance and at a saving. The same end results are obtained for a bag comparable to a six-ply bag by adding one set of structural strips in a five-ply bag. No gluing is required on valve bags, but the structural strips are spot pasted in sewn open mouth bags to prevent shifting.

The savings possible are indicated by the fact that reducing the amount of paper required can result in saving of from 5 - 15% of the cost of the bag.

•

Phillip's NH_3 Storage Tank

Phillips Chemical Co., Bartlesville, Okla., will soon complete a 323,000-barrel aqua ammonia storage tank adjacent to Cactus plant near Etter in the Texas Panhandle. The chemical company, wholly owned subsidiary of Phillips Petroleum Co., produces ammonia, ammonium nitrate fertilizer, and nitrogen solutions at Cactus plant.

Seasonal demand for ammonia as a fertilizer is heaviest in the spring, although fall use is increasing. Thus, summer and winter storage of aqua ammonia in tanks such as the one nearing completion helps Phillips to provide customers with adequate supplies when they are most needed for spring and fall soil enrichment.

•

Panogen Offers "Panodrin"

Panogen, Inc., Ringwood, Ill., recently developed a new product, "Panodrin", a seed treatment for combined protection against disease and soil-borne insects. The material is a liquid fungicide-insecticide, containing cyano-(methylmercuri) guanadine. It also contains aldrin.

The product is being marketed on a commercial basis. It has been tried in North Dakota with satisfactory results against stem rust on wheat, and for cereal grain and cotton seeds.

•

Buln. on Nitroform

Nitroform Agricultural Chemicals, Division of Woonsocket Color & Chemical Co., Woonsocket, R. I., offer a 4-page, 3-color bulletin on "Nitroform," its 38% urea-form nitrogen. The fertilizer is suggested for turf, trees, shrubs, citrus, truck crops, and nursery. The product is a synthetic organic chemical.

•

Kraft Automatic Bag Filler

An automatic open mouth bag filling machine by Kraft Bag Corp., New York, is described in a new 4-page booklet. The machine will handle weights from 25 to 200 lbs. at rates of 22 to 100 lb. charges a minute. The company reports a minimum of maintenance cost and a saving in production costs.

New Pulva Bulletin

Pulva Corp., Perth Amboy, N.J., announces the availability of a new bulletin, # 5510, describing its line of high speed pulverizers. The "Pulva-Sizer" is available in five sizes ranging from ¾ H.P. to 75 H.P.

•

Mixer for Insecticides

Rapids Machinery Co., Marion, Iowa, describe the Marion Mixer for dry and semi dry materials, such as insecticide formulations or fertilizers, in an eight-page folder on the equipment. The bulletin describes standard and heavy duty models, having capacities of ½ to 2 tons.

For formulations requiring the uniform introduction of liquid additives, Rapids Machinery suggest the Marion spray unit which contains spray nozzles inside the mixing cylinder. Pressure is said to be adequate to provide a fine spray mist necessary for uniform saturation.

•

Fulton Announces New Line

Introduction of a new line of valve bag packaging machines embodying the most advanced developments, is being made by Fulton Bag and Cotton Mills, New Orleans. These packers will carry the brand name "Ful-Pac," and are custom designed and built for Fulton by one of the nation's foremost manufacturers of bag packers. Addition of the packer line will provide further coordinated service to the many trades served by Fulton. Initially, the line will consist of three basic models, with others expected to be introduced at later dates.

•

New Day Dust Filter

A new unit dust filter has been announced by the Day Co., Minneapolis., Minn. Known as the Day "Type RJ" dust filter, it is the most recent addition to the line of reverse jet dust filters offered by the firm.

The new filter is reported to lend itself well to all continuous process equipment because no shut down is needed for rapping or cleaning. Cleaning and discharge of material is handled automatically and continuously.

ARE YOU USING THIS
Proven Carrier
IN THE FAST GROWING FIELD OF
GRANULAR INSECTICIDES and HERBICIDES?

Terra-Lite® BRAND VERMICULITE

The use of granular toxicants for the control of insects and weeds is growing at a rapid rate. Terra-Lite brand vermiculite has already proven itself an ideal carrier. Two Terra-Lite "plus benefits" which will be major factors in further broadening this "new market" are: ease of application and the use of conventional equipment. Before deciding on your formulating plans in the granular field, consider the following other advantages of Terra-Lite vermiculite:

- Lower carrier cost per lb. of finished product.
- Over 27,500,000 particles per lb. (28/65 mesh).
- High absorbency — free flowing even when high concentrations are formulated.
- Practically non-reactive.
- Release of toxicant is assured regardless of soil moisture conditions.
- Quick service—available from over 40 plants.

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Please send latest data on commercial use of Terra-Lite vermiculite and also actual samples, as checked:
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FERTILIZER ROUND TABLE

(*From Page 49*)

hydrous ammonia, nitrogen solutions, sulfuric acid, phosphoric acid, steam, hot or cold water, compressed air, fresh air.

The ammoniator-granulator was described as a cylindrical shell 7′ in diameter and 14′ long. This, according to Mr. Leister, is the size required for 20 ton per hour capacity in most grades of fertilizer. "Base" materials and fines are fed into the first, or ammoniating-section. Acid is fed into the second half of the ammoniating section. From here the material spills into the granulation section. Granulation can be increased or assisted when hot or cold water (in a fine misty spray) is added to the rolling material in the granulation section.

Mr. Leister gave complete details of the Renneburg ammoniator-granulator, listing operation data and technique. He reported several features of the unit which allowed for better granulation and more complete ammoniation. One practice he suggested to the production group was: screening the product before cooling . . . then cooling only the finished product. "This," he said, "offers the advantage of recycling hot fines, and a system in which the product will be cooled to a lower temperature." The practice also offers the possibility of eliminating the cooler dust collector. "The big advantage would be to a fertilizer manufacturer who has a small cooler, and wants to produce granular fertilizer at a capacity above that of the cooler. He can save the cost of a cooler, if his cooler is not required to do the unnecessary job of cooling the fines and oversize."

Mr. Leister reported that considerable success has been obtained with the use of a vertical disintegrator to produce a more uniform particle size by impact mixing. The disintegrator, he said, is able to delump the mix, and impact mix the various ingredients, and yet produce a minimum of fines . . . thus a uniform product is obtained, which should result in better ammoniation, and possibly better drying action.

A continuous combination ammoniator-granulator, said Mr. Leister, permits the nitrogen to be introduced into the materials at a slow rate, thus a high total ammoniation can be reached with relatively little loss of nitrogen and fumes.

F-P MIXTURES

(*From Page 41*)

tions usually involves installing extra equipment to keep down dust.

The health hazard does not end with the manufacture of the mixture. Farmers using such mixtures should also remember that they are handling toxic materials and follow all the precautions prescribed for handling the pesticides. Fertilizer-pesticide mixtures should be produced by thoroughly incorporating the pesticide uniformly through the fertilizer mixtures.

TABLE 2

Estimated Consumption of F-P Mixtures in the U. S. and Territories

Region	Fertilizer-Pesticide Mixtures		All Mixed Fertilizers, 1953-54[a]
	1952-53	1953-54	
	Short Tons	*Short Tons*	1,000 *Short Tons*
New England	400	950	352
Middle Atlantic	1,000	1,800	1,838
South Atlantic	60,000	73,200	5,022
East North Central	2,500	6,700	3,621
West North Central	2,000	42,600	1,343
East South Central	200	1,200	2,040
West South Central	100	100	713
Mountain	1,100	1,450	56
Pacific	11,100	11,100	273
Territories[b]	8,700	10,000	283
Total	87,000	149,100	15,541

[a]Scholl, Wallace, and Fox (10). [b]Puerto Rico only.

TABLE 3

Summary of Fertilizer-Pesticide Mixtures with Respect to Principal Kinds of Pesticides, Crops, and Pests

Region	Pesticide Used[a]	Crop Treated[a]	Pest Controlled[a]
New England	Chlordan; DDT, lindane, 2,4-D	Turf, Potato	Grubs, wireworms, weeds
Middle Atlantic	Chlordan, aldrin; DDT, dieldrin, 2,4-D	Potato, turf; corn	Wireworms, grubs, weeds; seed-corn maggot
South Atlantic	Chlordan, aldrin; DDT, dieldrin, heptachlor, toxaphene, 2,4-D	Corn (peanut, potatoes, tobacco, vegetables); cotton, strawberry, turf	Corn rootworm, wireworms; cutworms, elongated flea beetle, grubs, maggots, mole crickets, sweetpotato weevil, weeds, white-fringed beetle
East North Central	Aldrin; chlordan, DDT, dieldrin, heptachlor, lindane, 2,4-D	Corn; onion, potato, strawberry, turf	Corn rootworm, wireworms; grubs, onion maggot, strawberry root weevil, weeds
West North Central	Aldrin; chlordan, dieldrin, heptachlor, 2,4-D	Corn; potato, turf, vegetables	Corn rootworm, wireworms; cabbage maggot, grubs, onion maggot, weeds
East South Central	DDT, chlordan; aldrin, heptachlor, 2,4-D	Corn; strawberry, tobacco, turf, vegetables	Corn rootworm, wireworms; ants, grubs, weeds, white-fringed beetle
West South Central	Aldrin, dieldrin, lindane, 2,4-D	Small grains, turf, vegetables	Grubs, maggots, weeds, wireworms
Mountain	DDT; aldrin, arsenicals, BHC, chlordan, heptachlor, toxaphene, 2,4-D	Potato, vegetables; alfalfa, small grains, sugar beet, turf	Wireworms; cutworms, grubs, maggots, weeds
Pacific	Aldrin; chlordan, DDT, heptachlor, IPC[b] lindane, 2,4-D	Potato, strawberry; cane berries, hops, mint, turf, vegetables	Wireworms, potato flea beetle, strawberry root weevil; grubs, spotted cucumber beetle, weeds
Territories[c]	Aldrin	Sugarcane	White grub

[a] For each region, the first group of items designates the major pesticide, crop, or pest.
[b] Isopropyl *N*-phenyl carbamate.
[c] Puerto Rico only.

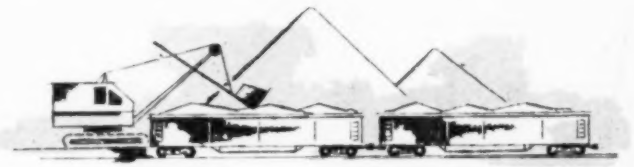
A good pesticide-fertilizer mixture is one where the fertilizer is well cured and where the pesticide is impregnated throughout the fertilizer uniformly.

Some of the most common faults in the production of the mixtures in the past have been: (1) Mere blending instead of thoroughly mixing the pesticide with the fertilizer; and (2) Adding the pesticide to warm, uncured fertilizer which often results in a loss of the pesticide through volatilization.

Farmers like fertilizer-pesticide mixtures because:

(1) Soil insects are problems in many areas.
(2) The use of a fertilizer-pesticide mixture makes application of the pesticide easy—two jobs, applying fertilizer and controlling insects, done in one operation.
(3) The use of fertilizer-pesticide mixtures has received wide popularity.
(4) The returns by and large have been satisfactory.

Disadvantages of using fertilizer-pesticide mixtures:



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Bright Canary Yellow
CRUDE SULPHUR
99.5% MINIMUM PURITY
Produced by our
3 MINES IN TEXAS and LOUISIANA
and our
SULPHUR RECOVERY PLANT - MANDERSON, WYOMING
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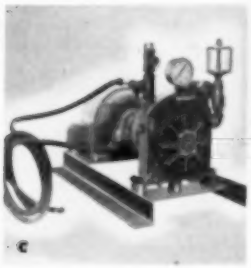
ideas

for low-cost bulk-material

- **STORAGE**
- **CHARGING**
- **BATCHING**
- **BLENDING**

Fertilizer Buckets — To stockpile, load and unload bulk chemicals, fertilizers, and other fine-grained materials, Johnson brings you a special wide-rehandling clamshell bucket. All-welded, fast-filling, clean dumping. Tight closing lips prevent load leakage. Sizes — ⅜ to 3 cu. yds.

Pivoted Distributor
directs flow of materials into multiple-compartment bins. Turns and locks into position, controlled from ground level.



Rotary Vane Compressor
supplies 7 cu. ft. of air pressure per min. to aerate silos and bins. Limit-relief valve keeps pressure within 15 lbs.

Aeration Fittings
for storage silos, bins, keep bulk materials free-flowing. Moisture trap and pressure reducing valve are included.

Bin Gauge Signals
accurately indicate high-low level of storage bins, silos. Automatic signal box can be located wherever convenient.

Rotary Plug Valve
controls flow of finest materials from silo to screw conveyor. It's also efficient as fill valve on batchers.

Elevator Buckets
are all-welded, smooth, fast-filling, quick-dumping. Two types, 8 sizes. Steel chain has all carburized knuckles.

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In the first place, it costs more to buy the pesticide in the mixture than it does to buy the fertilizer and pesticide separately. What's more, the rate of applying the pesticide is dependent upon the rate at which the fertilizer is applied. For example, doubling the rate of fertilization doubles the rate at which the pesticide is applied when using a standard fertilizer-pesticide mixture.

There is one development that might change this upward swing in usage of fertilizer-pesticide mixtures. The development of a special hopper for the pesticide to be attached to the fertilizer distributors is not new. One company is already manufacturing such equipment. Other concerns have manifested interest in such developments. Their widespread adoption could mean far less headaches to both the farmer and the fertilizer manufacturer.★★

OS1836---A NEMATOCIDE

(*From Page 60*)

The results contained in Table 3 confirm the earlier reports of the excellent control of foliar nematodes with the use of Systox and OS1836. This test further demonstrated that with Systox, the percentage of control increased with time at least up to 4 weeks, whereas OS1836 reached its maximum effectiveness within a week. OMPA, although giving substantial control, did not approach the nearly 100 percent effectiveness of Systox and OS1836.

Both Systox and OS1836 produce phytotoxic symptoms in the form of leaf tip burn at the 1.0% and 0.5% levels, which explains why the percentage increase in leaf weight was less at these than at the 0.1% concentration. Consequently, 0.1% would appear to be the most profitable concentration to use. OMPA, on the other hand, did not appear phytotoxic at any of the concentrations used.★★

FARM PRACTICE

(*Continued from Page 29*)

threw up his hands when I told him I was spraying lindane months after

he had recommended, and putting on fertilizer at the 'wrong time.' But I killed the bugs just as well as the guy down the road, and my alfalfa is in its seventh year. So what's the difference, as long as I get the results? Besides, I had one bad experience with that agent. He persuaded me to set aside 30 or 40 acres of my alfalfa for a fertilizer experiment, and his recommendations darn near ruined my crop. Those boys are experimenting at the expense of the farmer and he's the one who takes the loss."

The farmer, of course, also "takes the grain," when there is one, and all our reports indicate that farmers every year are increasing their incomes by the hundreds of thousands of dollars because of experiment station and county agent recommendations.

But we weren't there to argue with Farmer B.; just to see how many and what kind of fertilizers and pesticides he is using and why. We think readers will agree that his attitudes are most revealing. They show, if he is to be regarded as an average farmer (and we suspect he is above average) that industry companies have, on the one hand, made some important inroads on Farmer B's rather entrenched outlook on new-fangled ideas; but, on the other hand, they have a long way to go in convincing him of the values of really progressive farming.

We have read, and published, strong arguments in support of many of the things Farmer B. is leery of- but there remains a long hard period of education and selling to break down his resistance. And every approach to the farmer should be made with the knowledge that he is a temperamental cuss who isn't the slightest bit interested in doing things your way unless you can prove to him that it is a good deal better, and more profitable than his.

SWIFT GRANULATION

(From Page 37)

The licensor has fixed this cost at 30¢ per ton of material produced for a period of 5 years.

Investment and Material Costs

THE Swift Reactor with only surge bin, feeder, and liquid flow indicators, can be furnished for about $25,000. Most manufacturers who are not now producing granular fertilizer will also require sulfuric acid and anhydrous ammonia unloading and storage equipment and possibly also nitrogen solution unloading and storage equipment.

Many combinations and variations of equipment are possible, depending on the degree of granulation desired and local conditions. Between the limits stated, a wide variety of costs of installation may be found.

The cost of materials will depend on location and may be easily calculated for granular 12-12-12 and 5-20-20 from the formulations previously given. Generally speaking, material costs are lower than for batch produced pulverized fertilizer, but in some cases are higher than other granulation processes, such as those using the TVA ammoniator. For many producers, these higher material costs and the royalty payments will be more than offset by the high production rate and flexibility of operation, the savings in nitrogen loss, and investment, operating, and bag costs.

Process Advantages

Semi-Granular

The advantages of this process using the Swift Reactor only, as compared with conventional fertilizer mixing, are a higher production rate with the same labor requirements, the use of lower cost raw materials, a lower nitrogen loss, lower moisture content in the product, less reversion of P_2O_5 and the production of a semi-granular fertilizer with the product particle size as high as 75% within the —4 +40 mesh range.

Granular

The Swift process for the continuous production of a granular mixed fertilizer provides:

1. Low investment cost.
2. High production rate.
3. Low rate material costs:
   Use of anhydrous ammonia and nitrogen solution, in place produc-

DRYERS
AMMONIATORS*
GRANULATORS*
ELEVATORS
COOLERS
CONVEYORS
for the Fertilizer Industry
CONTINUOUS COMBINATION AMMONIATOR - GRANULATOR
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MILLER LAW

(*From Page 32*)

we must review with a very critical eye all recommendations for the use of pesticides on dairy animals or feed and forage to be fed to such animals. In many cases where pasture and forage crops are concerned, we may need to insist on qualified recommendations, i.e., except where dairy animals are involved, crops not to be fed to dairy animals, etc. The question of tolerances for pesticides in meat is under consideration at the present time. No clear-cut rulings have been made, but it appears probable tolerances will be established for meat and poultry products.★★

INSECT SURVEYS

(*From Page 48*)

other areas. In addition, newspapers, radio, and television are other media widely used to keep the public informed of existing and impending conditions.

An insect that came to public attention within the past three years might be used for an example of a pest on which several of the aforementioned types of survey have been applied. The khapra beetle, one of the worst pests of stored grain, was found by a grain inspector to be infesting grain in a Tulare County, California warehouse. Specimens were submitted to the California Department of Agriculture, which made the identification as khapra beetle. The California authorities made information on this find available to the

entire nation through the November 20, 1953 issue of the "Cooperative Economic Insect Report." The following month, the insect was identified in Arizona. Following these finds, which were not the result of an organized survey, it was determined that a survey should be initiated to delimit the spread of the insect. This initial survey was a cooperative undertaking between the Stored Products Insect Section, Agricultural Marketing Service, the Economic Insect Survey Section, Agricultural Research Service, and State Departments of Agriculture in ten western states. From this survey, the insect was found in additional localities in California and Arizona and for the first time in New Mexico. No specimens were found in the other states included in this systematic survey. From the survey it was determined, after appropriate public hearings, that a quarantine against the khapra beetle would be desirable. Such a Federal quarantine became effective February 21, 1955, which affected establishments with known khapra beetle infestations. After establishment of the quarantine, it became the duty of the Khapra Beetle Control Program and cooperating State Departments of Agriculture to conduct surveys in the affected states, in order to properly enforce the regulations. Inspections in states not known to be infested have been made by various cooperative personnel at points known to have received shipments from infested properties. Countless other observations have been made by state and federal employees, grain elevator operators, and other individuals throughout the United States. Specimens suspected of being khapra beetle have been submitted to the Insect Identification and Parasite Introduction Section for identification from at least fifteen states not known to be infested. This one pest has demonstrated the united effort that can be developed in looking for an insect.

Emphasis has been placed upon the cooperation between different agencies in the execution of the various surveys. No article on surveys, however, should be written without a discussion of the extensive state and individual survey programs which have been established. California and Illinois might be used as examples of states which have recognized the importance of insect surveys and formed organizations to carry out such programs.

California, by legislative commitment, in 1947 made insect pest surveys a specific activity of the Bureau of Entomology in the State Department of Agriculture. The purpose of the survey program is to detect incipient infestations of insect species (and also mites) new to California, which may be known pests or potential pests. For survey purposes, the state is divided into three districts, with a survey entomologist assigned to each district. The survey entomologists assist in training county personnel in correct survey procedures and in critical areas give attention to major survey problems.

Two sections of the Illinois Natural History Division are associated directly with insect surveys in that state. In addition to other functions, one of the duties of the Section of Economic Entomology is the conducting of insect surveys relating to economic insect problems. The Section of Faunistic Surveys and Insect Identification is, as the name implies, charged with the responsibility of conducting faunistic surveys and performing the function of insect identification, which is necessary to any insect program, whether it be research, control, or survey.

Individual farmers are fast realizing the immediate benefits of insect surveys, particularly those looked upon as service surveys. With this realization a very important phase of entomology is developing, one in which the grower engages an individual or organization to systematically survey his crops and advise the proper procedure to be followed in insect control. Such surveys may dictate that chemical controls may or may not be needed. Quite often substantial savings are made by withholding chemical controls, as well as determining the proper time for appli-

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cation. To date these farmer-paid surveys are more prominent in the cotton areas but can and should be expanded to other crops. During the 1955 cotton-growing season, fifty scouts were employed by cotton growers in Arkansas. These individuals were hired and supervised by entomological agencies of the state university, which have jurisdiction over the program. In some states, the growers deal directly with the individual or organization, while in other instances a district or cooperative group is the contracting unit. The paid scouting program was in such a demand in some areas that its expansion was limited by the number of competent survey personnel available.

Any survey, to be most effective, should be conducted on a systematic basis. The method of obtaining data must be adapted to the insect in question and the stage of development at the time of survey, as well as to the purpose for which the information obtained is intended. Many techniques are used in making surveys. Airplanes may be used for surveys on some forest insects. Light traps, baited traps, or in some instances traps employing the use of sticky substances are used. Soil insects require their own special methods. Actually, the various methods employed for surveying are almost as numerous as the species of insects involved. The Economic Insect Survey Section recently reissued a series of survey methods which were developed by various entomologists to systematically determine the status of insects. Some of the methods discussed are for the purpose of determining whether or not controls might be needed, some for predicting expected infestations; and some are the methods used by entomologists in their research work.

Regardless of the type of insect survey program with which an individual may be concerned, whether it be quarantine or a general insect survey program, any data will be of far more value for both immediate and future use if obtained and reported upon in quarantine terms. Too, by all entomologists working together in observing insect conditions and making such conditions known, American agriculture will be better protected and economic insect pests better controlled.★★

LIQUID FERTILIZERS

(*From Page 6*)

ated here. It is advisable to use the services of an engineering and equipment company in view of the inherent problems of this new industry, and also to take advantage of the latest developments and improvements. The ultimate problem for the prospective manufacturer is to be sure that the complete liquid fertilizer is promoted successfully and sold. The product is not new to the farmer, but in some territories the farmer is a bit slow to accept it except on a trial basis. It is that trial order, however, that quickly convinces the farmer that he can save back-breaking labor and much of his valuable time by converting over to the complete liquid fertilizer program.★★

THE FUTURE ENTOMOLOGISTS

(*From Page 53*)

work. Certainly there is nothing wrong with this proceedure—in fact, it offers real advantages in some instances. There is a growing tendency toward more breadth in undergraduate training, since it provides a firmer base upon which specialization can be built. There are many job opportunities open, however, for candidates with training at the bachelor's' level with equal financial opportunity afforded by competing fields, for which applicants are not available. Many of our larger universities are doing a better job of attracting and training graduate students than in interesting undergraduates in the opportunities that are available. Although many students at the undergraduate level in agriculture elect one or more courses in the fields of entomology, plant pathology and horticulture, yet they are not always

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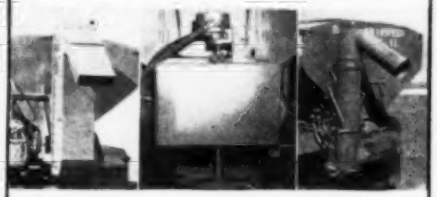
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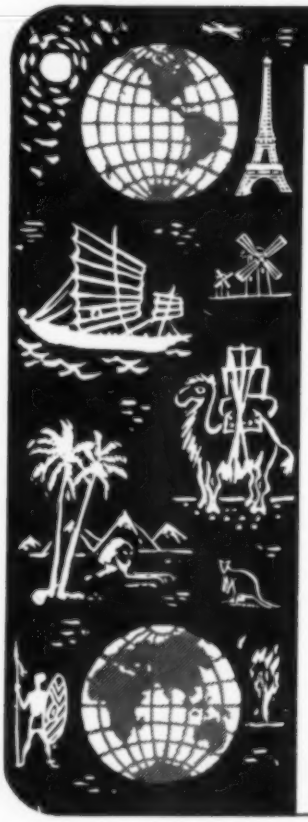

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trained well enough to accept positions at graduation with industry and government in these specialized fields.

I feel that the responsibility rests with the men and women working currently in the broad field of pest control. We must tell, and tell again, the story of our work. The recent brochure issued by the Entomological Society of America outlines many of the opportunities in the entomological profession. The pest control field cannot afford to rely upon those who may have drifted into it after trying something else; it needs to have its share of competent, interested students from the outset. We do not need large numbers of students, but rather to make our opportunities known in order that we may select and encourage those capable and interested ones to prepare themselves for a productive and successful career.

It is most encouraging to note the growing support that industrial and government supported foundations are giving to educational institutions as scholarships, fellowships and grant supported research. This financial aid enables students to find employment and to gain experience that is valuable in making up their minds as to whether the field is attractive to them. The stimulus of research in progress is often a fascination that is attractive to students during formative years. We need to give them the opportunity to work under direction and with trained personnel while they are getting their college training. I would hope that the pest control field might soon attain more unrestricted support for aiding outstanding students to the extent that basic fields of chemistry, engineering, electronics and others now have.

The problem of top-flight personnel in the future need never arise if we tackle it today. It is vital to industry, government and the colleges to see that the recruitment continues for the pest control fields. We are doing a good job, but we could do a better one. Our profession in the future cannot be better than the quality of its workers. It is worth our continuing effort to encourage, select and train young men and women through our combined efforts, and to do so as the years go by.★★

FERTILIZER VIEWS & NEWS

(*Continued from Page 52*)

terest to our industry, he is invited to send them to me for further discussion in this column. The fact that ammoniation of the fertilizer mixture is so widely practiced in our own country perhaps reduces somewhat the corrosion problem. The British comments, as above reported, may still be of general interest to many American fertilizer manufacturers.

Efficiency Not the Only Solution

WE hear it argued often that the factor which will help more than any other to solve the farm problem is a higher rate of production per man-hour. That has always sounded plausible to me. I was interested, therefore, in a statement made by a prominent farm leader which significantly modified this concept. While it is true, he said, that increasing production per man-hour through improved techniques is a a very important factor in raising farm income and living standards, other problems are often encountered which prevent farm people from getting what they earn as a consequence of their higher productive efficiency. He emphasized that agricultural prices and farm income are affected by certain factors which do not operate on the income of other groups. For example, weather conditions and certain economic factors will nullify the benefits to be expected from increased efficiency. A large crop, under certain conditions, will not give the farmer as large a net return as a smaller one.

You see, he continued, farm prices shift easily, they are relatively unstable compared with those of industrial products and with the prices of goods and services farmers buy. This may give the farmer an advantage when prices are going up, but

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may put a squeeze on him when they are dropping. Farm prices fluctuate more than the general average of all prices. One of the difficulties is that some of these other prices which fluctuate less than agricultural prices, include such things as transportation rates, machinery costs, and other items forming a part of the general farm costs and are expenses tied primarily to hourly wages. Farm costs went up from $6.75 billion in 1940 to about 23 billion in 1953, whereas farm prices have dropped about 20% since February 1951, due primarily to high agricultural production and less foreign demand.

Another economic factor in the picture is the relatively inelastic demand for many farm products. If the supply of a farm product increases or decreases, a change in price more than is proportionate, may be the result. For example, if the supply of a farm commodity increases by 10%, and consumer demand remains the same, the price may decrease by more than 10 per cent. Most farm prices are still largely determined on a free market despite government support. The price of many industrial commodities, however, can be determined by the manufacturer, since he is able to cut production and hold prices up. From 1929 to 1932 farm prices fell about 56%, and production dropped only 3%, while in contrast, in the same period prices in the iron and steel industry dropped only 16% while production was cut 76%; motor vehicle prices dropped 13%; production was cut 74%.

These considerations permit one to understand much better the position of agriculture regarding a price support program. Agriculture wants to feel that it will not bankrupt itself by its own more efficient production efforts.

Our experience with farm leaders makes me believe that farmers generally do not want Uncle Sam to guarantee them a profitable price. They seek reasonable price protection without price fixing. The more successful farmers want to produce more efficiently as a means of earning a good income. They want to produce for the market and not for the government storage. They are entitled to a reward commensurate with their efficiency in production and marketing. Since the fertilizer industry is so intimately tied in with the fortunes of agriculture, we should work for and support programs aiming at the long-range prosperity of the American farmer: these comprise continued improvements in research and education, improved distribution facilities, expanding consumer markets and more fundamental studies on the relationship between crop response and soil fertility levels. A prosperous agriculture makes for a prosperous fertilizer industry.

Storage Problem

THe fertilizer industry has always had to live with the problem of seasonal buying, with its concomitant problem of providing adequate storage facilities to absorb the production in months of low usage and demand. During the war years, when fertilizers were allocated by government regulations, farmers were inclined to buy their requirements early out of fear of possible shortages in the planting season. Following the war exigencies, the pattern of buying returned to its customary form, — with peak buying in the March-April period. This same seasonal peak pattern is plaguing the industry in some European countries, where the trend is increasingly toward the use of compound fertilizers.

Is there a solution to this problem?

Several methods have been tried: price inducements and more aggressive sales-campaigning. Neither approach has succeeded. Perhaps the price inducements have been too small to persuade a majority of farmers. Some manufacturers nullified this local inducement effort by offering the same discount on purchases to be made in the spring peak period. One producer, we are told, failing at price inducement for pre-season purchases, is sub-

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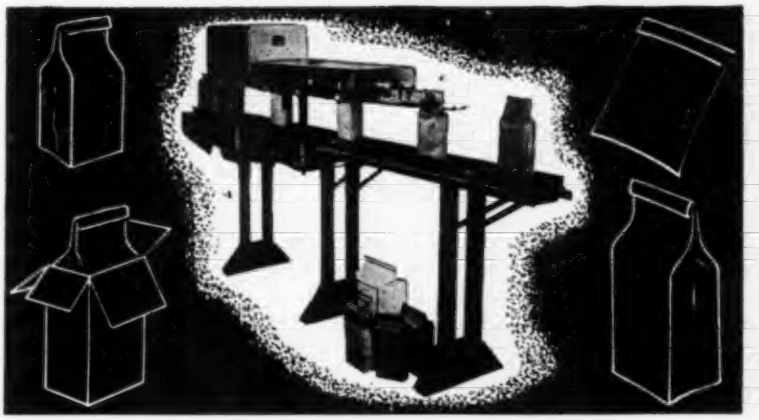

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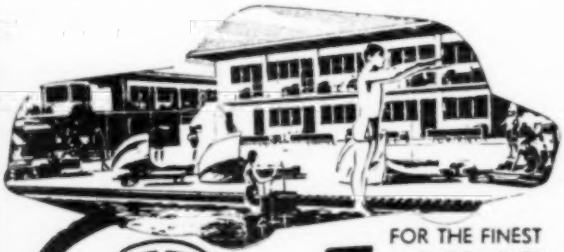

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sidizing dealers so that they can increase their storage facilities, at the same time, he offers them extended credit to induce early buying.

Price inducement to encourage early buying has also been tried in Great Britain with about the same lack of success it has had in our country. In England, as here, the margin between fertilizer production costs and selling prices is too small to permit any substantial discount for early season puchases. It seems inevitable that farmers will persist in their custom of buying their fertilizers close to the time they want to use them. The answer perhaps is to provide adequate storage space at the plant or in the territory, accompanied by moderate production capacity, in place of high production capacity with insufficient storage.

In this connection, it is interesting to speculate on what may happen in some areas where farmers seem to be turning to "blended" mixtures or liquid fertilizers offered by new supply factors. These newer developments are at present operating without adequate storage space. Should these new supply factors succeed to the point where the old-line manufacturer may be forced to withdraw from the territory, farmers might conceivably run into a spring crisis in which they could not obtain their fertilizer supplies, when needed owing to lack of local storage facilities.

Apparently, farmers generally do not appreciate the value to themselves of the service represented by the storage facilities established generally by the old-line fertilizer industry. No one perhaps is to be blamed for this except the industry itself owing to failure to apprise the farmer of this phase of its service to him.

Salting Phosphates

SOme of you may recall the news item appearing about a year or so ago to the effect that adding a pinch of salt to raw phosphate rock before acidulation and subsequent ammoniation reduced the extent of reversion in available phosphate. The research workers cited a number of small-scale tests in support of this result. They showed that it was the sodium ion of the sodium chloride that produced this effect, since it occurred whether the salt added was the nitrate, chloride, sulfate or fluoride salt of sodium. The effect was measurable, whether the sodium salt was included in an N P K mixture before ammoniation, or mixed with superphosphate before ammoniation, or mixed with raw phosphate rock prior to acidulation and ammoniation. The effect of the sodium was claimed to be more noticeable when treated fertilizer was stored at a high temperature, a condition that generally favors reversion. The optimal effect was produced when the salt added was equivalent to about 1% of sodium in the fertilizer.

Has anyone tried this salt business on a large scale? It seemed like a good idea, sodium chloride being cheap and the effect an economic asset in fertilizer manufacture. The amount of availability thus preserved is considerable, if it is expressed as a percentage of the total phosphate in the fertilizer, as for example, a reduction in reversion from about 4% of total P_2O_5 to 1.2%, or expressed in another way, a reduction of the citrate insoluble from about 0.6% to 0.15 per cent. One commentator at the time speculated that if sodium was this helpful inside the fertilizer, perhaps it might also be helpful in retaining more availability in the soil Wasn't it Dr. G. D. Scarseth who recently emphasized that we need in agriculture more "hypothesizing" in our thinking if we are to advance in science? The economic possibilities of this pinch of salt in fertilizer manufacture deserve speculation and large-scale tests.

"Fertilizers are often discussed as an aid to maintaining soil fertility, but an even more important function is to raise soil fertility sufficiently to allow better kinds of crops to be grown profitably in new and more productive systems of agriculture."

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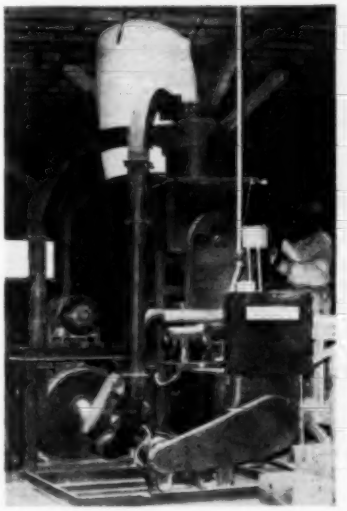

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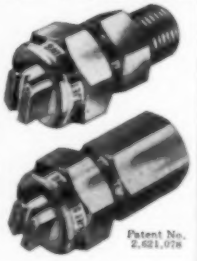

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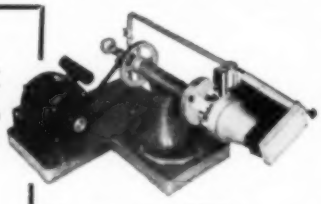

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Report of Herbicide Res. Com.

A preliminary report based on a survey made of experiment station and industrial personnel engaged in weed work in the Northeastern area was recently submitted to its members by the Research Coordinating Committee of the Northeastern Weed Control Conference. The report reviews the use of various herbicides and weed control measures for a series of specific crops. The committee cautions that the report does not constitute a list recommendations but is to be used only as a guide by those who have to make specific herbicide recommendations for local use.

The research committee also reminds members of the NEWCC to note that the Miller Law, 518, places a new responsibility on any agency or person making specific recommendations for use of herbicides on crops to be used in interstate commerce. There are some chemicals, of course, which will present no residue problem as used in normal agricultural practice. Chemicals so listed by the pesticide regulations section of the USDA will not require a numerical tolerance. It is expected, they indicated, that many herbicides will fall in this category. However where toxic residues are involved no recommendation for grower use should be made unless a residue tolerance and/or a label has been approved. At the present time, the committee reports, the law has been generally interpreted to hold legally liable not only the seller of the chemical but the person or agency making a recommendation which results in an excessive residue.

The Northeastern Weed Control Conference for 1956 will hold its annual meeting January 4-6 at the Hotel New Yorker, New York City.

COTTON CONFERENCE

(*From Page 34*)

fore agricultural chemicals reach the market to help farmers combat insects and disease, and to help them defoliate plants to make harvesting easier and more efficient.

"If the cotton farmer could plant seed covered with a chemical which would protect the seed and also be taken up into the seedling and thus render it resistant to attack by disease ortanisms, many problems would be solved," observed N. D. Fulton, University of Arkansas. In discussing cotton seedling diseases, Dr. Fulton held out the hope that pathologists may find a way to control plant diseases by systematic fungicides.

Alfred B. Wiles, State College, Miss., told the conference that "the possibility of using irradiation as a means of developing a source of resistance is being considered. Cotton variety strains that offer high level resistance to Verticillium wilt disease have already been developed," reported Mr. Wiles, "however, the problem that we face is this . . . not to develop a cottor. with Verticillium resistance as its chief trait, but rather to add, if possible, this extra bit of quality to our already fine cottons."

In connection with the problem of boll rots, John T. Presley, USDA, suggested that the best way to control this problem is through practices which reduce, or prevent, the occurrence of favorable conditions of moisture and temperature under which boll rots develop. "To do this," he advised, "we must begin with the chemical treatment of planting seed, and follow through until the crop is harvested." Mr. Presley recommended also that growers follow a good insect control program, and that they avoid extra heavy applications of nitrogen which produce rank vegetative growth.

Farmers today need only half the land required 30 years ago to produce a bale of cotton, Dr. Russell Coleman of the National Plant Food Institute told the Cotton Production Conference, as a guest speaker at the 2-day meeting. "The most significant thing here, however, is not the fact that America's farmers can produce more and more cotton, but rather that they can lower production costs by increasing per-acre yields." Dr. Coleman said that a major contributing factor to per-acre yields is increased use of fertilizer. He added that, by combining all up-to-date production practices, farmers can further increase average acre yields from 339 to 520 pounds

Dr. Coleman's remarks on increased efficiency and reduced costs were appropriate to the over-all theme of the production conference, attended by approximately 800 agricultural leaders from throughout the Cotton Belt. The meeting has emphasized the importance of fitting together all recommended production practices into a single "package," to help the farmer reduce costs and attain maximum efficiency.

In a review of "Highlights of 1955 Research on Weed Control in Cotton," Walter K. Porter, Jr., Louisiana Agricultural Experiment Station, told conferees that data from Texas cotton areas indicate from 4 to 6 spot-oilings of Johnson grass clumps will eliminate up to 95 per cent of this weed in one year. Various herbicidal oils, he said, can give satisfactory control and finally eliminate Johnson grass in cultivated crops. Regarding the pre-emergence concept of weed control, Dr. Porter reported, extensive field studies have been made to determine a sound program involving the use of CIPC or Karmex DL, two promising pre-emergence herbicides for cotton. While neither of these can be expected to give complete control of all weeds, the experiments were made to use them as another cultural tool to reduce hand labor, not to eliminate it, he said.

In the case of nut grass, still a persistent problem in many cotton fields, Dr. Porter reported there has not been any chemical program developed yet that will solve this problem. However, he said, the effect of the chemical, Amino Triazole, on nut grass appears to warrant continued studies on the possibility of its use as a control agent.

"The most practical approach to the problems posed by wilt and nematode diseases of cotton is in the breeding of resistant varieties," according to Dr. A. L. Smith, of the U. S. Department of Agriculture. Mr. Smith said that wilt losses in some areas have been reduced to the vanishing point by widespread use of resistant varieties. However, losses from nematode diseases are now seen as a greater menace than wilt, and the nematode problem is now getting priority attention.

In addition to the use of resistant varieties, he also listed the following as means by which cotton growers can reduce losses from wilt and nematodes:

(1) Use of soil fumigants on severely infested soils.

(2) Rotations with corn, sorghums, small grains, and other crops.

(3) Application of sufficient fertilizer to maintain maximum yields, with sufficient potash to prevent rust.★★

ENTOMOLOGISTS MEET

(*From Page 40*)

6. Certain provisions of the Act may be extended until July 22, 1956.

"Repeating . . . how and where can we find out where a product stands in the six categories listed during the next few months? From the manufacturer."

"We are now entering the growing season where pesticides are required for food, feed and fiber production," observed Mr. Hitchner. "Unfortunately, in some areas on the part of the federal and state officials, industry personnel and growers, there is uncertainty as to how to comply with the Law. There is an undue fear of seizure of crops for excessive residues and concern that there will be a shortage of the necessary chemicals to control pests where tolerances have not already been established or an exemption for the necessity of a tolerance shown.

"There is no justification for undue fear from this situation" reported Mr. Hitchner, "if the problem is approached from a practical viewpoint."

"The responsibility for the determination of residue data and toxicological data is primarily that of the basic manufacturer. Responsibility for directions for use is also primarily on the manufacturer, but is shared with the Department of Agriculture and the land grand colleges, who also make use recommendations.

"There is only one practical solution during this period of change, and the answer is a relatively simple one if used with reasonable discretion. Our recommended program is *Follow the directions given on the registered labels of reliable manufacturers.*"

"Labeled directions" he repeated, "if carefully followed as to dosage and timing, are reasonable assurance that the finished product will be within safe residue limits, if any residues exist."

Arthropod Populations

IN a report on the effect of pesticides on the balance of arthropod populations, W. E. Ripper, Fisons Pest Control, Ltd., Cambridge, England, outlined to ESA members a theory for controlling pests and yet avoiding the build-up of resistance. Incautious or ignorant use of pesticides on crops, he said, may overthrow the often complex equilibrium which exists between the varieties

of insect and mite species present . . . some of which act and interact as a natural check on the population of the others.

Dr. Ripper observed that the major danger in application of pesticides is the destruction of natural enemies. He suggested using selective insecticides, which shift the balance of the arthropod population in favor of the pest's natural enemies. Selective pesticides, he continued, leave the predators and parasites alive to prevent the survival of resistant mutants. Complete elimination of the pest in this way, he warned, may lead to the dispersal of its enemies in search of other food, which in turn is followed by reinfestation. The great problem which poses itself, therefore, observed Dr. Ripper, is whether pesticides can be used so precisely as to reduce the level of the pest population to the point at which it no longer does harm, but keep the relation of pest and predator in equilibrium.

"To solve this problem," concluded Dr. Ripper, "is to maintain the natural dynamics of nature, which is artificially disturbed by first providing pests with too much food (the crop) and then wiping out species indiscriminately (non-selective spray treatments). Experiments with Schraden on the cabbage aphid, for example, have shown that this difficult problem is capable of solution."

House Fly Control

THE search for more effective means of controlling house flies and stable flies in dairy barns continues, and several reports on research along this line were reviewed. E. J. Hansens, Rutgers University indicated that tests of phosphate insecticides for housefly control have been continued using both residual treatments and wet and dry baits. "Diazinon was by far the best material tested." Other materials in order of effectiveness were: Dow ET-14 (O,O-dimethyl O-2,4,5-trichlorophenyl phosphorothioate), American Cyanamid 4124 [O,O-dimethyl O-(2 chloro-4-nitrophenyl) thiophosphate], chlorthion, Dow ET-15 (O-methyl O-2,5,6-trichlorophenyl phosphoramidothioate) and malathion. Of the dry baits, Diazinon and Bayer L-13/59 were best. Dow ET-14, Dow ET-15, American Cyanamid 4124, and certain malathion formulations were also effective. Wet baits are about equal to dry baits and have the advantage of some residual action. Analysis of milk from herds housed in barns sprayed with Diazinon or treated with Diazinon baits showed that there was no Diazinon in the milk, no cholinesterase inhibition, and no effect on flavor.

Studies by H. F. Schoof and J. W. Kilpatrick, USDA, Savannah, Ga., also indicated good results with Diazinon. They reported too that a Dipterex-sugar formulation gave promising results.

Resistance to Insecticides

D. W. HAMILTON, USDA, in discussing laboratory studies conducted over a three year period, reported that data obtained are not sufficient to prove that differences in codling moth susceptibility to DDT sprays are necessarily due to the use of DDT, although such reasoning seems logical. Data on codling moth control in grower orchards and experimental plots, however, suggests that resistance to DDT has developed.

A development of resistance of the European red mite to parathion observed in 1952 was reviewed by C. R. Cutright, Ohio Agricultural Experiment Station, who advised that the cessation of parathion usage for one season did not reduce resistance to that material. Cessation of parathion usage for two years, however, permitted the reemployment of parathion with good results, indicating that resistance was definitely reduced.

Dr. Cutright reported that parathion resistant mites were easily controlled by demeton and related systemics . . . and that non-phosphorus miticides, such as ovex, Aramite, Dimite, Chlorobenzilate, etc., gave adequate control of this resistant population.

J. S. Roussel and D. Clower of the Louisiana Agricultural Experiment Station, reported that laboratory and field experiments conducted during 1955 show that boll weevil has developed resistance to the chlorinated hydrocarbon insecticides. They said that in some areas of Louisiana control is no longer possible with the chlorinated hydrocarbons. (See *Agricultural Chemicals*, November, 1955, Pgs. 64-65).

Future of Entomology

STRESSING the need to overcome the development of resistance to insecticides, George W. Irving, Agricultural Research Service, USDA, told ESA members and guests that the future offers many opportunities for expansion. More research efforts will have to be devoted to residues, and work coordinated with that on other chemicals; forage and grassland farming offer an almost unexplored field of research involving millions of acres; biological control is another field, he said, that should be more fully exploited.

Economic Entomology

D. R. C. C. Alexander, Geigy Agricultural Chemicals, presented a review of chemicals in pest control, prepared by G. R. Ferguson. Dr. Alexander addressed a meeting of the Joint Committee on Grassland Farming held November 30th in cooperation with the ESA.

Dr. Ferguson, concentrated on the "economic" use of chemicals in agriculture and suggested that this is one field in which progress, in his opinion, has not been entirely satisfactory . . . as it applies to such activities as grassland farming and other farming activities that normally bring in a relatively low gross dollar return per acre. He reminded that the average farm operator is basically interested in one thing . . . "profit."

Dr. Ferguson cited examples illustrating the problem of economics of low priced crops, and suggested that the productive potentials of grasslands might have to be revised as a result of additional research. "This point can only be evaluated in terms of total yield or production versus total cost of production, and it must be expressed in terms of dollar value received versus dollars of expenditure. Much work needs to be done on methods and techniques before the economic basis can be firmly established," he concluded.★★

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Tale Ends

AS pesticide manufacturers and distributors closed their books for 1955, many were in the happy position of being able to report the biggest year, volume-wise, since 1951. And though it seems to be getting to be a habit to deny that anyone made any money, the figures for the year just concluded are reported happily to be principally in black ink. Looking ahead to 1956, the outlook seems to be for another good year in pesticide sales. Reading the figures on the over-wintering boll weevil population, and the acreage where grasshopper infestations are anticipated in '56 (see pg. 57) the coming pesticide sales year could be a good one indeed.

* * * * * * *

The answer to increased sales volume and higher profit ratios is found by many industries in the sale of specialty products. (See pg. 45). Naphthenate preservatives for wood and textiles would make a logical off-season product for many pesticide or fertilizer dealers. More on this in a later issue.

* * * * * * *

Another interesting specialty is a product for restoring the green color of grass. A formulation for this purpose has recently been patented (U.S. #2,714,062) by two residents of Southampton, L. I. Provided there is still some life in a brown lawn their product, they say, will turn it green once more. Chief ingredient is urea. To this they add small quantities of tannic acid and a chlorophyll compound which promotes rapid absorption of the nitrogen. While waiting for this to take effect, early results are guaranteed by inclusion in the formula of a green color which washes off on watering.

* * * * * * *

Agricultural research specialists at Rutgers University, New Brunswick, N. J., are employing the confused flour beetle (old *Tribolium Confusum* himself) as a new, diminutive, low-cost experimental "animal." The economy of substituting flour beetles for rats, mice, guinea pigs, etc., is evident time-wise as well as money-wise. To achieve with rodents the same data supplied by a glass container full of flour beetles, ninety cages full of rats would be required.

* * * * * * *

Ma-Der-Gro fertilizer, a product of Hale Laboratories, Bay City, Texas, has been getting considerable publicity in the pages of a number of Texas newspapers recently. Readers of this column may recall our item (August, pg. 106) in which we saluted this new "miracle" product and its developer, Perry W. Mader. Mr. Mader is now in production with "Ma-Der-Gro" liquid fertilizer and "Ma-Der-Gro" synthetic manure, described as "the most economical plant foods available."

Reporters for the *Galveston News*, the *Houston Chronicle* and the *Valley Evening Monitor* were somewhat more lyrical in their observations on the new product, and with no reason on their part for any concern as to the possibility of prying federal eyes checking their labels, made some even more extravagant claims for the new "miracle" product. To start with it smells like lilacs. Contains uranium. It speeds up harvest time of most vegetables by fifteen days. According to the *Monitor* the formula for the new product contains no nitrogen, (at variance with the labeling we saw) but possesses the unique ability to attract nitrogen from the air and place it in the soil. Like most such amazing and secret formulas this one was discovered by accident when an overdose of cobalt and barium got mixed into another formula. A small amount spilled on a glass surface and nitrogen crystals formed on the glass.

Good luck, Mr. Mader. Too bad you didn't come along sooner. You might have saved the government all the trouble of building Muscle Shoals. And how about all the jillions currently going into anhydrous ammonia plants?

Keep That Sales Curve Headed Up!

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